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Defense Management Journal

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Defense Management Journal

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EDITORIAL

A Lesson in Economics

Everyone talks about it but few understand it. No, not the weather—the economy.

So we asked the experts whither we were trending. Their analyses (presented in this issue of the Defense Management Journal) demolish some popular folklore.

E.G.:

- Myth: *Less for Defense means more for non-Defense governmental programs.* Reality: "There is no objective way to determine whether $1 billion would provide more benefit to society if spent on Defense, on investment, on consumption, or on public non-Defense programs . . . . The main point is that decisions about national priorities should result from a comparison of *all* the alternative uses." (Page 5).
- Myth: *With GNP growth exceeding 4 percent a year, many billions will become available for reaching new horizons in the next 5 years.* Reality: ". . . a 1975 GNP of $1200 billion (in 1969 prices) will only barely cover presently visible claims upon it, leaving only $12 billion (1 percent) of slack. For 1970, 1971, 1972 and 1973, there is essentially no slack at all." (Page 5.)
- Myth: *Government purchases will take proportionately bigger bites of national output over the next 5 years.* Reality: "By 1975 Government purchases are estimated to take only 19 percent of the national output—down from the 22 percent expected in 1970." (Pages 7–8.)

We also learned something about inflation. When does a budget cut hurt most? Answer: When it follows a hefty inflation. The Defense Comptroller points out that the forces purchased for $78.7 billion in FY 1969 cannot be purchased in FY 1971 for the same amount, due to pay and price increases. He states that inflation cost Defense $5.9 billion in that 2-year period. Add that to the $6.9 billion reduction (from a $78.7 billion program for FY 1969 to the estimated $71.8 billion program for FY 1971) and the budget cut in *real* dollars is $12.8 billion—a 16.3-percent decrease over a 2-year period. (Page 19.)

Commenting on the soaring cost of weaponry since World War II, the Vice Chief of Naval Operations notes that:

- The 1943 version of the submarine *Pintado* cost $4 million while its nuclear namesake of 1969 cost about $100 million.
- The aircraft carrier *Bon Homme Richard* cost less than $64 million in 1944 while the new nuclear carrier (CVAN 69) when "fully equipped with crew, ordnance and planes . . . will represent an outlay of about $1 billion." (Page 30.)

Of course, one way to deflate some of the inflation is to come up with more and more cost-cutting insights in developing and producing weapons systems—and the best way to assure that result is to keep the managerial heat applied through every step of the process. Unfortunately, contends one logistics official, weapons systems management "too often evidences a dismaying unconcern for searching out cost-reduction opportunities." (Page 33.)

As if in postscript to that official's thought, the Vice Chief of Naval Operations says: "Admiral Moorer and I believe that cost consciousness ought to be a matter of record in civilian personnel ratings and military fitness reports. This factor must be given more weight by selection boards and promotion panels." (Page 31.)

Hopefully, may it be so.

Seven Basic Principles

Excerpted from *Economic Report of the President, February 1970.* United States Government Printing Office, Washington, D.C. Pages 10–11.

Since this is my first Economic Report, it is in order for me to set out the basic principles that will continue to guide the management of economic policy in my Administration:

First, *the integrity and purchasing power of the dollar must be assured.* To re-create confidence in a secure future, we must achieve that reasonable stability of the price level which has been so severely eroded since mid-1965. The unfairness of a steeply rising cost of living must not again be inflicted on this Nation.

Second, *our economic policy must continue to emphasize a high utilization of the Nation's productive resources.* We must maintain a vigorous and expanding economy to provide jobs for our growing labor force.

Third, *we must achieve a steadier and more evenhanded management of our economic policies.* Business and labor cannot plan, and consumers and homebuyers cannot effectively manage their affairs, when Government alternates between keeping first the accelerator and then the brake pedal to the floor.

Fourth, *Government must say what it means and mean what it says.* Economic credibility is the basis for confidence, and confidence in turn is the basis for an ongoing prosperity.

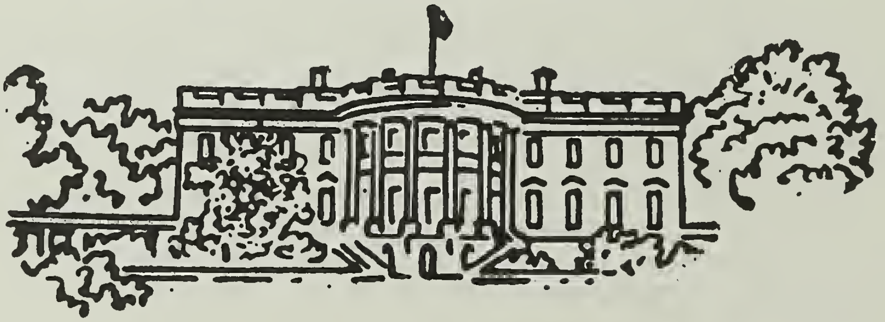
Fifth, *we must preserve and sustain the free market economy in order to raise the standard of living of every American.* The most basic improvement in our national life during the last three decades has come through the doubling of real purchasing power that our free competitive economy has delivered to the average American family. No Government programs during that period begin to approach this doubling of real income per family as a source of our improving economic well-being. Government now has both the ability and the duty to sustain a general climate for stability and growth, but it must do so in the firm conviction that only a free economy provides maximum scope for the knowledge, innovativeness, and creative powers of each individual.

Sixth, *we must involve the American people in setting goals and priorities by providing accurate, credible data on the long-range choices open to them, making possible much better informed public discussion about using the resources we will have in meeting the needs of the future.* The 1970 Annual Report of the Council of Economic Advisers is a long first step in that direction.

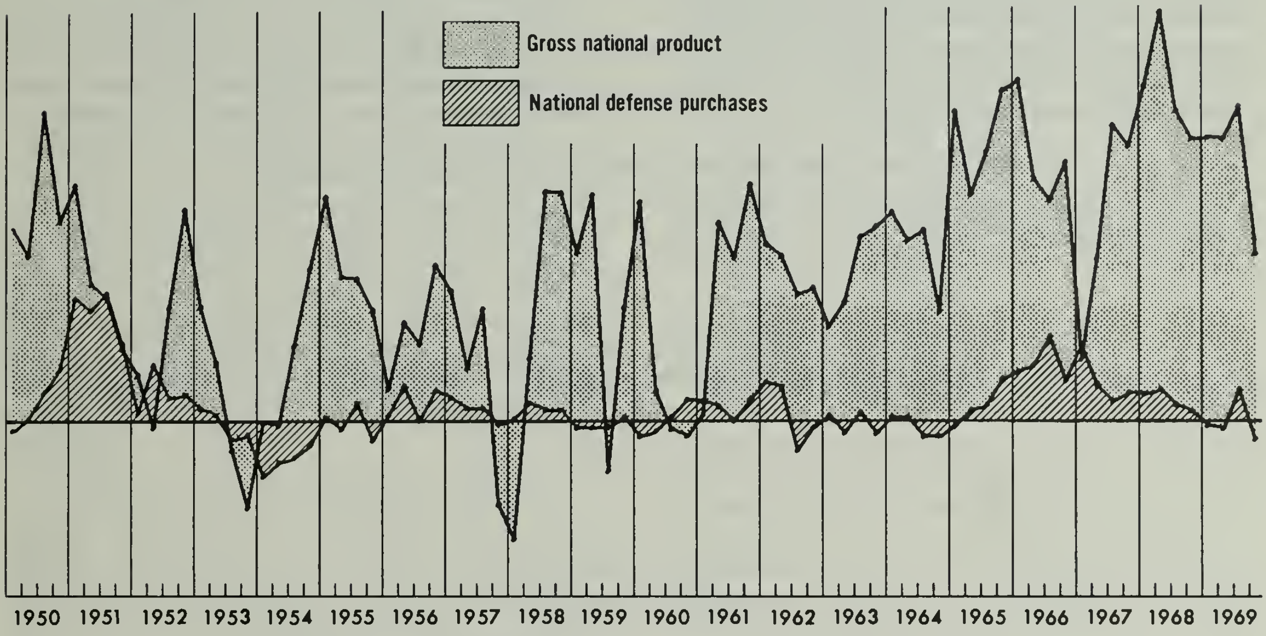
Finally, *the free economy of the future will rest squarely on the foundation of genuinely equal opportuntiy for all.* Some, because of race or national origin, find themselves situated far back of the starting line in our economy. Others by the happenstance of health, accidental injury, education, or economic background are unable to participate fully in our economic life; still others become casualties of obsolete skills. We are deeply committed to make a reality of the promise of an equal opportunity in life, so that the fruits of our economic progress and abundance will become available to all. The national conscience demands it, human dignity requires it, and our free and open economic system cannot be fully effective without it.

RICHARD NIXON.

FEBRUARY 2, 1970.



DEFENSE AND THE ECONOMY



(From* Defense Indicators, *U.S. Dept. of Commerce, February 1970.)

THERE CAN be little doubt that defense spending, which consumes over 8 percent of the gross national product, has significant impacts on the U.S. economy. There is considerable debate, however, as to just what these impacts are and are not, and more particularly, as to how they impinge on the definition of national priorities. It may be useful to explore some of the issues surrounding this issue.

Antithetical Myths

In viewing the public debate over the impacts of defense spending, one often comes across the following diametrically opposed points of view. On the one hand, it is argued that defense spending is highly inflationary, and that a high level of defense spending is inconsistent with price stability. On the other hand, there are some who maintain that without a high level of defense spending the economy would stagnate—that we need defense spending to maintain low unemployment and rapid growth. Neither economic experience nor economic logic provide any support for these ideas.

> *"The problem of national priorities has recently become linked with defense spending, at least in the public eye. From the economists point of view, there is no reason why this should be so. Defense spending, like any other type of spending, is best viewed as one of many claims on the GNP."*

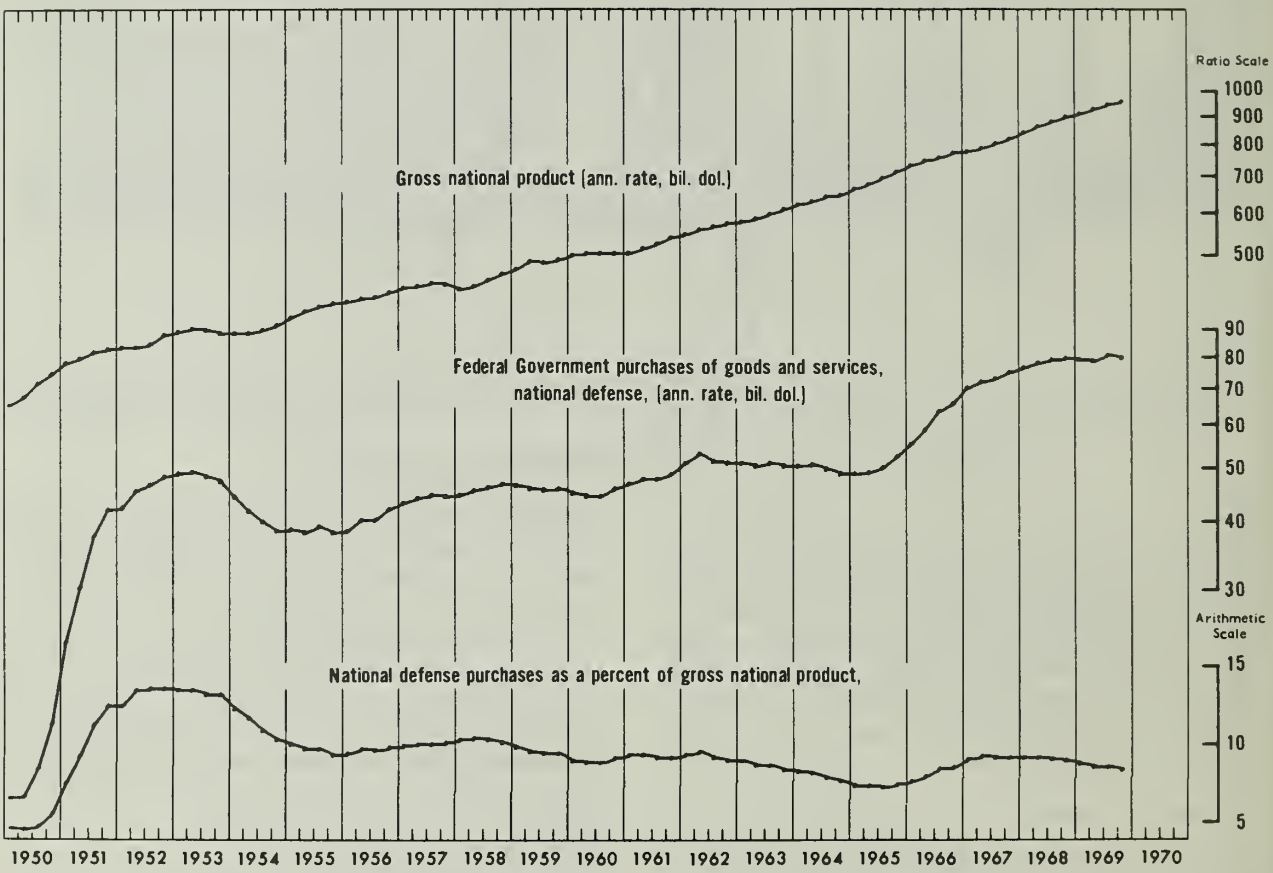
The behavior of economic growth and prices is dependent on the level of total demand for output, of which defense spending forms but a small fraction. Thus, for any level of defense spending, fiscal and monetary policies can be devised that would adjust nondefense spending to a level consistent with optimum amount. As we are well aware, however, finding and implementing this ideal mix of fiscal and monetary policies is not always an easy task.

By **PAUL W. McCRACKEN**

Chairman, Council of Economic Advisers

Defense spending only becomes a stabilization problem when its level changes rapidly and unexpectedly. Thus, a sharp increase in defense spending is likely to cause some inflation, while a rapid decrease might cause some transitional unemployment. It was a rapid increase in defense spending, not compensated for quickly enough by tax increases or expenditure cuts in other areas, that caused the inflation from which we are still suffering. In principle, of course, there is some set of policies which could cope even with large variations in defense spending. When such variations are unforeseen, however, the implementation of such policies is extremely difficult, although we would hope to do better in the future than we have in the past.

Gross National Product and National Defense Purchases



(From Defense Indicators, *U.S. Dept. of Commerce, February 1970.)*

Defense Spending and GNP

It has been suggested that in absorbing 8 or 9 percent of GNP defense procurement distorts the overall structure of relative wages and prices. Of course it is true that any change in the makeup of GNP, be it in the production of weapons or toothbrushes, will change the structure of relative wages and prices. But this should not be considered "distortion." It is part of the process by which the system adapts to producing what is demanded. More important, however, is the charge that the inherent nature of defense spending is inflationary. If, for various reasons, defense contractors are able to bid wages to levels that other employers would have to match, then the overall impact of defense spending would be inflationary. To date, however, there is little evidence that such a process has taken place.

The greatest impact that defense spending has on the economy stems directly from the simple fact that over 8 percent of GNP is used for the maintenance of the national security. The question of whether or not this level of expenditure is inflationary is somewhat academic, as with proper economic policies and management techniques there is no reason for any level of defense spending to be inflationary. What is important is that by spending 8 or 9 percent of the Nation's output on defense we are not spending it on other things—from rebuilding our cities to designing better mousetraps. It is this impact—the impact on alternative uses of the resources in question that brings us squarely to the issue of determining national priorities.

National security is not an all or nothing proposition. There is no dollar figure above which we would get total security and below which we would get no security. If there were such a figure, we would presumably spend that amount. The problem of priorities only arises because national security is a matter of degree. Thus, we have to decide whether more or less of it is worth the cost, which is the sacrifice of other objectives that would be necessary to obtain it.

National Priorities

There is no objective way to determine whether $1 billion would provide more benefit to society if spent on defense, on investment, on consumption, or on public nondefense programs. Such a determination must be made at the highest levels of Government—by the Congress and the President. The appropriate officials should make the decision based on their knowledge both of public needs and wants and of the probable impacts on society that would result from the adoption of various courses of action. The technician's job, be he defense analyst, economist, or both, is to improve the information upon which these decisions rest, both by advising the decisionmakers and by raising the level of public discussion.

Fundamental to improving decisionmaking on national priorities is a comprehensive analysis of the probable consequences of the adoption of any particular course of action. Our concern, then, cannot merely be with the Federal budget, as actions taken within the Federal budget invariably have impacts on private behavior. For example, a decision to increase defense spending will reduce Federal nondefense spending, or private investment, or private consumption—depending on what financial plan accompanies the defense decision.

The main point is that decisions about national priorities should result from a comparison of *all* the alternative uses, both public and private, of parts of the national output. Thus it is not useful to ask whether $1 billion would be better spent for defense or health. Even if this question were answered we would not know whether to increase or decrease these programs unless we also know the value of other expenditures that are alternatives to both. Basically, then, the priorities problem is to allocate the total national output among all its uses, not to allocate some smaller amount of money between national defense and Government civilian programs.

The Premises for Decision

In order to tailor Federal decisions concerning allocation to rational analysis of national priorities, the following items are required:

1. An estimate of what the future national output will be.
2. An idea of what the claims upon the national output that are eligible for consideration will be.
3. A view of the policy measures—and their consequences—that would be necessary to bring about satisfaction of these claims.

Once these items are more or less in hand it is possible to decide, at the highest levels of Government, which claims are be satisfied and which policies should be used to satisfy them. It should be obvious that at no time will the output exceed the claims—we will always want to do more than we can. If this were not so, there would be no problem of national priorities.

Tentative estimates of the first three items have been made, and, tentative as they may be, they reveal much about the priorities problem and the necessity for further analysis of it. Perhaps most striking is the fact that a 1975 GNP of $1,200 billion (in 1969 prices) will only barely cover presently visible claims upon it, leaving only $12 billion (1 percent) of slack. (See table next page.) For 1970, 1971, 1972, and 1973 there is essentially no slack at all.

Assumptions and Projections

Numbers such as these do not, of course, come out of a hat, and, no matter where they come from, there is considerable margin for error. The assumptions upon which these projections are based, however, are reasonable ones—they are based on the historical behavior of the components of GNP and a rather conservative view of the growth of Federal spending.

Since our concern was with the entire national output, the first step in making the projections was to forecast potential GNP, which is the maximum possible level of output. Potential real GNP was projected to grow at 4.3 percent a year. As a consequence of the fight against inflation, actual GNP was projected to be below potential for an interlude, after which actual GNP was expected to grow with potential GNP.

Federal spending was broken down into two components—the baseline and Presidential initiatives. The baseline is simply the cost of present programs, adjusted for pay and population increases, minus the cost of those programs which could be phased down during the relevant period. Presidential initiatives are those programs to which the present Administration has made a commitment. These will amount to about $15 billion per year by 1975.

It was assumed that the tax law signed by the President last year would remain in effect over the period in question. Based on this law, and upon the baseline projected growth in transfer payments to persons, disposable personal income was projected. From this figure were obtained estimates for consumption (the lion's share of the national output) and the other uses of per-

Gross national product, 1969 and projections for 1970–75

[Billions of dollars, 1969 prices; calendar years]

Claim	1969, actual	Projections					
		1970	1971	1972	1973	1974	1975
Gross national product available	932. 3	944	980	1, 042	1, 103	1, 150	1, 200
Claims on available GNP	932. 3	944	980	1, 042	1, 100	1, 144	1, 188
Federal Government purchases	102. 0	93	89	88	87	87	86
State and local government purchases	112. 7	116	120	125	131	137	142
Personal consumption expenditures	576. 0	594	620	664	704	735	769
Gross private investment	141. 7	141	152	166	178	186	192
Business fixed investment	99. 3	103	105	111	116	120	125
Residential structures	32. 2	29	34	40	46	49	49
Other investment	10. 1	10	14	15	16	17	18
Excess of claims	.0	0	0	0	−3	−6	−12

NOTE.—Projections are based on projected Federal expenditures and their influence on various components of GNP.

Detail will not necessarily add to totals because of rounding.

SOURCE: Council of Economic Advisers.

sonal income. Personal saving was assumed to be 6.5 percent of disposable personal income, which reflects recent history.

Furthermore, it was assumed that residential construction would follow a path consistent with the goal of 26 million new units by 1978 set by the Housing Act of 1968. Business and inventory investment, which account for the rest of GNP, were projected to return to about 12.5 percent of GNP. (At present, they account for about 13 percent, but this is higher than the historical average.)

These projections are not meant to be forecasts—we do not mean to say that in 1975 the national output will be allocated as shown in the table. The purposes of making and publishing these projections is twofold: First to give decisionmakers and the public a notion of what will happen if no basic changes in policy are made. Second, to provide an illustrative example of the application of analysis to the problem of determining national priorities.

Essentially, the projections show that if we want to increase defense spending, nondefense spending, consumption, or anything else, the necessary resources will have to come out of the other categories. Federal budgets can be increased, but we cannot consume more than the GNP. The "peace and growth" dividend that has gotten so much play in the press is already largely spoken for by existing and proposed Federal programs, tax reductions and the probable private demands for goods and services.

The problem of national priorities has recently become linked with defense spending, at least in the public eye. From the economists point of view, there is no reason why this should be so. Defense spending, like any other type of spending, is best viewed as one of many claims on the GNP. It is presumed to provide benefits to the Nation, as are all other claimants. In determining what level of security is to be purchased, decisionmakers must take into account the other benefits—public and private, which must be foregone to obtain any given level of security. This should be done for spending on urban problems, on agriculture, on education, and any other function for which the Federal Government is responsible, in whole or in part.

This Administration has made a considerable effort to see that the problem of national priorities is dealt with systematically by the President. The National Security Council, the Cabinet Committee on Economic Policy, and the Defense Policy Review Committee have been especially concerned with providing the President with options and probable consequences as they relate to the entire Nation, and not merely to the national security defined narrowly.

We would hope, of course, that our methods and techniques will improve, and that the President (and the Congress) will in the future have available improved information and techniques for dealing with the determination of national priorities. It is through them that the important decisions must be made. It is the function of the economist to give them the best possible information upon which to base those decisions. □

THE POST-VIETNAM ECONOMY

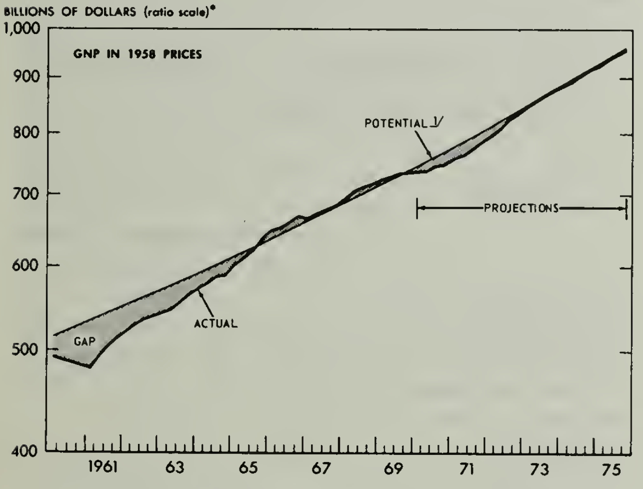
Any comprehensive analysis of the impacts on the United States of achieving peace in Vietnam needs to be made in the context of the economic environment in which these events will occur. It is useful to distinguish between the short-term economic outlook and the prospects for the longer term.

The Short-Term Outlook

In the period immediately ahead—1970 and 1971—the American economy is undergoing an adjustment. The substantial inflationary pressures which developed during the Vietnam buildup were accentuated by large Federal budget deficits and a liberal monetary policy. For more than a year now, the Federal Government has pursued a policy of economic restraint, designed to dampen down the inflation and to do so without precipitating a major downturn in the economy as a whole.

The means for pursuing this anti-inflationary effort have been primarily to operate the Federal Government at a modest surplus and to reduce the growth of the money supply. The results thus far are mainly a clear slowing down of what was an overheated national economy. Inflation is continuing, but not at the accelerating rate that characterized earlier periods. It is our expectation that the rate of inflation will decline measurably in the coming year and that this will set the stage for the subsequent period of sustained real growth in production, employment and living standards.

Gross National Product, Actual and Potential



*SEASONALLY ADJUSTED ANNUAL RATES.

[1] TREND LINE OF 3.5 PERCENT FROM MIDDLE OF 1955 TO 1962 IV, 3.75 PERCENT FROM 1962 IV TO 1965 IV, 4 PERCENT FROM 1965 IV TO 1969 IV, 4.3 PERCENT FROM 1969 IV TO 1970 IV, 4.4 PERCENT FROM 1970 IV TO 1971 IV, AND 4.3 PERCENT FROM 1971 IV TO 1975 IV

SOURCES: DEPARTMENT OF COMMERCE AND COUNCIL OF ECONOMIC ADVISERS

The GNP of the U.S. is projected to rise more than 4% each year during the post-Vietnam time period.

But in the short run, the proper national economic policy is one of responsible restraint. Hence, reductions in military demand resulting from winding down the Vietnam war will, in addition to obvious social benefits, reinforce our economic efforts. It would tend to both reduce the Government's demand for military goods and services and, as servicemen are returned to civilian life, increase the labor force available to produce goods and services for nonmilitary purposes. To some extent, the pressures on our balance of international payments would be lessened as the extent of United States activities in Southeast Asia is reduced.

Table 1 presents some projections of the American economy for the calendar year 1970 (in constant dollars). It can be seen that the Federal Government's own purchases of goods and services are being cut back substantially, and that new housing construction is expected to continue to feel the effects of a less liberal monetary policy. In contrast, the other sectors of the economy are projected to continue to grow in real terms but at a much slower rate than in recent years.

The Longer Term Outlook

As we look out beyond 1970, to the middle of the decade, we get a better picture of what a nonwar economy may look like. Table 2 compares the 1970 distribution of output with a projection for 1975. Clearly, a larger proportion of our resources is likely to be devoted to civilian purposes, and particularly through the private sector. By 1975, Government purchases are estimated to take only 19 percent of the national out-

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By **DR. MURRAY L. WEIDENBAUM**

Assistant Secretary of the Treasury for Economic Policy

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put—down from the 22 percent expected in 1970. The following analysis of longer-term trends in each of the major sectors of the American economy is based on a joint research effort of the economic staffs of the Bureau of the Budget, the Council of Economic Advisers, and the Department of the Treasury.

The Consumer Sector

The total income of individuals is anticipated to grow substantially between now and 1975. This would result from the rising employment necessary to produce the national output and, in turn, would make possible very significant increases in the average standard of living of the American consumer. A portion of this personal income goes for the payment of income taxes to the Government. On the other hand, after tax income is bolstered by transfer payments which, in turn, are made by the Government (social security, veterans pensions, interest on the public debt, and so forth).

On the average, it is assumed that individuals will save 6½ percent of their after-tax incomes and spend the remainder on (1) automobiles, home furnishings, and other durable goods; (2) food, clothing, and other less durable commodities; and (3) recreation, repairs, and numerous other services. The total impact of all consumer spending should raise the personal consumption share of our total national output from about 63 percent in 1970 to 65 percent in 1975. This move is what would be expected in a nonwar environment.

Housing

There is likely to be a very substantial increase in the rate of family formation in the next 5 years. Both because of the backlog of need created by the housing declines in 1966 and 1969–70 and because of the increased demand for housing generated by new families, the number of housing starts is likely to rise considerably in the early 1970's. The housing share of GNP, a rather low 3 percent in 1970, should rise to a more normal 4 percent by the mid-1970's.

In the Housing and Urban Development Act of 1968, the Congress stated a goal of 26 million new housing units to be built during the 10-year period ending June 1978. On that basis, about 2½ million new homes would be built each year during the 1975 time period.

Business Investment

Large amounts of investment in plant, equipment, and inventories will be necessary to produce the GNP shown here. About 11 to 12 percent of the GNP will have to be invested each year in new capital stock in order to maintain reasonable capital-output ratios. In addition, inventory investment and net exports are projected to grow roughly in line with the gross national product between 1970 and 1975. This would maintain an approximately constant ratio of stocks to final sales. Net exports are expected to rise from the 1969 low as the U.S. trade position improves.

Federal Government Purchases

Federal purchases of goods and services (the great bulk of which is devoted to national defense) are expected to decline significantly between 1970 and 1975, as the Nation returns to a more peacetime situation. A large defense effort, of course, will need to be maintained in order to meet the continuing requirements of protecting the national security.

In contrast, however, proportionally small amounts of Federal civilian expenditures are devoted to direct purchases. Rather, civilian agency budgets mainly take

TABLE 1.—*Gross National Product, 1969 and 197*

[Billions of dollars. In 1969 prices]

Category	1969 actual	1970 projected	Change
Personal consumption expenditures	576	594	+18
Housing construction	32	29	−3
Business investment	109	112	+3
Federal government purchases	102	93	−9
State and local government purchases	113	116	+3
Total	932	944	+12

TABLE 2.—*Distribution of GNP, 1970 and 1975*

[Dollar amounts in billions of 1969 dollars]

Category	1970		1975	
	Amount	Percent	Amount	Percent
Personal consumption expenditures	$594	63	$777	65
Housing construction	29	3	49	4
Business investment	112	12	144	12
Federal government purchases	93	10	87	7
State and local government purchases	116	12	143	12
Total	944	100	1, 200	100

TABLE 3.—*Projections of Federal expenditures, 1970–75*

[National income accounts basis, billions of 1969 dollars]

Category	1970	1971	1972	1973	1974	1975
Existing programs:						
Purchases	92	88	87	86	85	84
Transfer payments	56	59	62	65	68	70
Grants-in-aid	22	22	22	23	23	24
Other	19	16	15	14	14	14
Total, existing programs	188	186	186	188	190	191
New initiatives:						
Purchases	1	1	1	1	2	2
Transfer payments	0	3	6	6	5	5
Grants-in-aid	0	2	3	5	6	7
Total, new initiatives	1	6	10	12	14	15
Total, Federal expenditures	189	192	196	200	204	206

the form of transfer payments to individuals (such as social security), grants-in-aid to State and local governments, and interest payments. These show up in the GNP as consumer expenditures or business investment or state and local purchases, as the ultimate recipients of the Federal funds respend them. Hence, the direct importance of the Federal Government in the American economy, when we look at its role as a consumer of resources, is likely to decline substantially between 1970 and 1975.

Table 3 contains detail on total Federal expenditures for 1970–75. Much of the increase in transfer payments will be due to increased coverage and population, as more people receive checks for social security, disability insurance, and so forth. Part will also be due to higher real benefits. Much of the increase in grants will come in essentially open-ended programs, such as medical, in which the Federal Government must provide matching funds if the states choose to spend money for the designated activities.

New initiatives already recommended by President Nixon (such as the family assistance program and revenue sharing with State and local governments) are estimated to rise substantially as they are put into effect, to $15 billion in 1975. The addition of other new programs in the years ahead would result in the relatively tight budgetary situation that we are currently experiencing.

State and Local Government Purchases

Purchases of goods and services by State and local governments are projected to grow with the GNP, population, and Federal grants-in-aid. Of the $26 billion increase in State and local purchases from 1970 to 1975, $8 billion is due to population increases. This leaves an anticipated increase of $18 billion over and above the cost of providing State and local services at the present per capita level. This would permit an average annual increase of 2.8 percent in the real per capita quantity of the services provided by this category of State and local spending.

Gross National Product

The GNP of the United States is projected to rise more than 4 percent each year during the post-Vietnam time period. Productivity (output per man-hour) is estimated to grow about 2.8 percent a year, on the average. These calculations, when viewed in conjunction with reasonable forecasts of population and the labor force, yield an employment rate of over 96 percent of the civilian labor force and a rising real living standard for the average American worker and his family.

Like any set of long-term economic estimates, these projections are illustrative; they are not meant to be precise forecasts. Rather, they indicate reasonable orders of magnitude and interrelationships. Changes in public policy could substantially alter the size and the composition of the GNP in future years. Yet, such statistical analyses are useful in showing how the American economy can quite successfully adjust to a more peacetime environment.

As most public and private studies have shown, the United States can afford to maintain the level of defense spending required for the national security, yet the economy is not necessarily dependent on military demand in order to maintain prosperity. □

We are playing "Russian Roulette" with our economy by failing to put a higher price tag on the value of good statistics.

IS THE GOVERNMENT'S ECONOMIC DATA RELIABLE?

WE HAVE come a long way in developing appropriate economic policy procedures for influencing our huge economy.

I wish I could say as much for the quality of our statistical information. And good statistical data are basic to the soundness of any approach to forecasting the economy, as well as to improving further our policy procedures.

Economic policy formulation is essentially the art of navigating in an economic environment that is constantly changing and for which our statistical maps and charts are seriously—sometimes alarmingly—incomplete.

President Asks Improvement

President Nixon is aware of this. Only 18 days after he took office, he issued an unprecedented memorandum on statistics, calling for:

- Speed-up in the compilation and release of the principal economic indicators.
- Publicly available advance schedules of release dates.
- Release by the principal statistical officer in charge.

To implement this, the Budget Bureau has:

- Established quantitative guidelines to carry out the President's request to speed up compilation, for example, the elapsed time between the end of a reference period and completion of compilation is not to exceed 20 working days.
- Introduced a report form that requires statistical agencies to submit quarterly reports showing past compilation and release dates and advance schedules.

The President's budget message to Congress included specific references to the need for improved statistics, and the budget itself includes funds for substantial improvements in the timing and accuracy of current economic statistics, for additional statistics required for interpreting and monitoring new social programs, and for more information to aid local authorities in carrying out their increasing responsibilities. Nonetheless, much remains to be done, both in government and in the private sector.

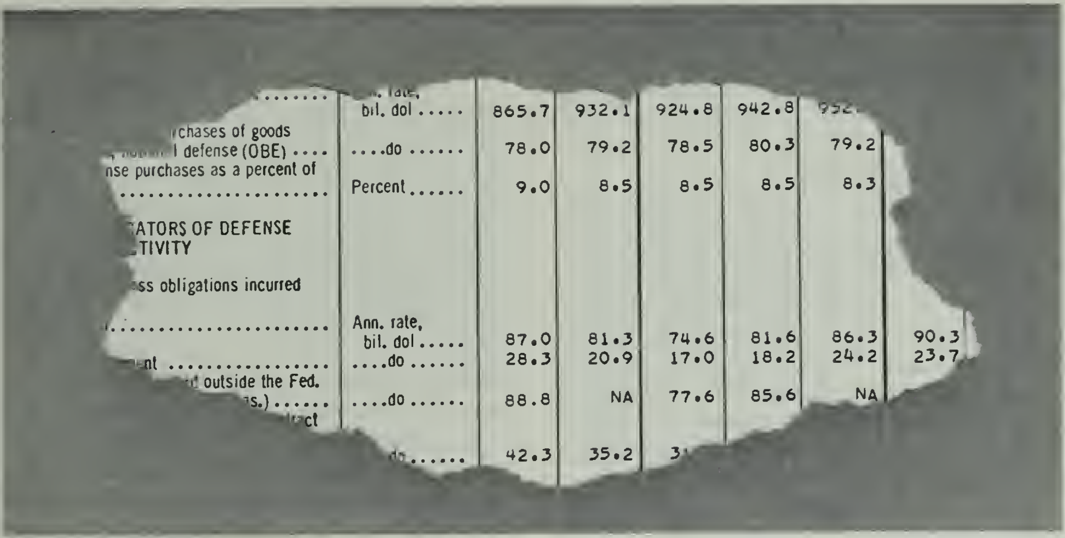
By **DR. MAURICE MANN**
Assistant Director, Bureau of the Budget

Those of us who are heavily involved in the statistical program of the Federal Government are determined to provide the type of statistical system—in terms of both quantity and quality—that a $1 trillion economy requires. We have made a favorable beginning. For example, we have already initiated a new approach to budgeting for Federal statistics—we now have a comprehensive budget for the various statistical programs of the Government. We expect by this approach to strengthen the position of statistical programs both for broad analytical needs—as in the case of production, price, and employment information—and for administering particular programs—as in the case of income and manpower data for welfare programs.

Budgeting Requires Quality Forecasting

The relatively small sum of money currently spent on Federal statistics provides information that should and could be a valuable policy guide for nearly every facet of economic and social life. Yet our data are not adequate for the exacting needs of current policy. Nowhere is the need for adequate statistics of high quality more pressing than in the area of economic forecasting. The information needed for forecasting begins with the needs of the Federal budget itself.

The essence of the budget is that it is a forward-looking plan whose data requirements for future actions are considerable. The roughly $200 billion of income and outlays that is in the budget for the upcoming fiscal year (1971) must be evaluated within the context of a forecast of the total economy. Budget decisions must



....	...n. rate, bil. dol	865.7	932.1	924.8	942.8		
...chases of goods ...l defense (OBE)	....do	78.0	79.2	78.5	80.3	79.2	
nse purchases as a percent of	Percent......	9.0	8.5	8.5	8.5	8.3	
ATORS OF DEFENSE TIVITY							
ss obligations incurred							
....	Ann. rate, bil. dol	87.0	81.3	74.6	81.6	86.3	90.3
nt	....do	28.3	20.9	17.0	18.2	24.2	23.7
outside the Fed. ...s.)	....do	88.8	NA	77.6	85.6	NA	
...ct	...do......	42.3	35.2				

be made not only on the basis of assumptions about the direction and pace of economic activity, but also on the basis of anticipations about the behavior of such exogenous factors as Vietnam, the Middle East, and tax and other legislation, as well as monetary policy.

Despite the unpredictability of a number of factors affecting the budget, resources have to be allocated in a way that will help assure stable economic growth. And this is not a simple exercise in macroeconomics. The aggregates have to be presented in all their details in the budget document, and thus the forward look of the Federal budget gets into nearly every policy concern of the Federal Government.

Congress is now at work on a budget that was presented to them in February 1970, hopefully will become operative on July 1, 1970, and will span the period until June 30, 1971. In view of the tendency for the level and composition of economic activity to change considerably in such an 18-month period, it is only natural that fiscal policy is often criticized for being inflexible as well as untimely. Economic conditions not infrequently change during the process of budget preparation. They also can be expected to change in the 6-month period from the time of presentation of the budget to the time of its becoming operative, and will change some more in the course of the fiscal year that is covered by the budget.

Scope, Timeliness and Accuracy Essential

It should not be surprising that those close to the making of economic policy plead for more and better information. While the most comprehensive, prompt, and accurate data do not guarantee appropriate public policy—at least as long as human judgment has, as it should, a major role in policymaking—appropriate policy cannot possibly be made without comprehensive, prompt, and accurate data.

Difficulties inherent in any kind of prediction are multiplied in attempting to forecast the behavior of the national economy. One serious obstacle to accurate forecasting is the fact that lags between policy actions and their economic effects are long and variable. Another major obstacle is the uncertainty about the nature of the impact of policy on the various sectors of the economy. Nevertheless, projections of future budget receipts and expenditures must be made continually for several quarters ahead, and they must logically reflect the projected interrelationship of the budget with the entire economy.

In large part, such projections involve appraisals of short-run changes in consumer demand, Government demand, and business investment—all in relation to a "desirable" path of economic activity. They also involve gauging the future course of monetary policy, and its influence on the behavior of money flows, credit flows, and interest rates. This is, of course, an exacting task that relies heavily on a great deal of economic information and accurate forecasting. But it also relies heavily on our ability to improve our forecasting methods. Good statistical data are basic to the soundness of any approach to forecasting—whether it be econometric, monetarist, or cyclical indicator in nature. But good statistics alone cannot guarantee accurate forecasts. Of equal importance is the strength of our forecasting methods. Thus, with the economy becoming increasingly complex, with overriding political forces nearly impossible to foresee, and with a lack of basic knowledge of the transmission and timing by which fiscal and monetary policies affect income, there is serious need for further research on the methods of forecasting aggregate demand, employment and prices.

The importance of better data in developing improved forecasting methods in part grows out of heightened demands for greater precision. Increased complexity of the economic environment leads to more exacting standards for economic information. We are becoming more concerned with small deviations from the desirable path of economic change, and we need increasingly refined measures of the small deviations or a more general understanding that small deviations are not significant. Nonetheless, we do need good statistics to understand the past and to provide a base for predicting the future.

Inventory Statistics a Troublespot

What kinds of obvious improvements should be made in statistics that serve as the basis for short-term economic forecasting? Such improvements are necessary because of the overriding national interest in our fully understanding the crosscurrents of economic activity. There is a wide range of places in which we could start, but probably as good a starting point as any would be our inventory statistics. Swings in business inventory investment are a major source of imbalance between aggregate demand and a desirable growth path. Nevertheless, poor data on inventories—as reflected in frequent sizable revisions—have caused serious misjudgment of the economic outlook at certain critical periods in recent years.

It seems inconceivable in any economy such as ours that the publication of inventory statistics is nearly 2 months behind actual developments. This means that as of the middle of June, we would have comprehensive monthly inventory data only through April. And at that, we are not sure those data would be accurate representations of what actually occurred. An example of the implications of the delay in inventory data is found in the fact that when the first preliminary GNP statistics are compiled toward the end of the relevant quarter, the inventory component of the GNP must be based on only 1 month's figures—and preliminary figures at that. Therefore, it is not surprising that quarterly GNP statistics are frequently and importantly revised.

An often cited example of such a revision—one that had an important bearing on public policy—is the case of the fourth quarter of 1966. The preliminary estimate of the annual rate of change in business inventories in that quarter was roughly $14 billion; we now know that the actual change was more like $20 billion. The significance of this nearly 50 percent difference for economic policymakers and policy advisers is only too obvious. We clearly and urgently need to develop more comprehensive and more prompt inventory statistics.

Retail Sales Data Also Deficient

Another area in which our statistics have been seriously deficient is that of retail sales—the principal preliminary indicator of the strength of consumer demand. In a number of recent months, the revision of the preliminary retail sales figure, which is made available 10 days following the end of the previous month, was greater than the average month-to-month change in retail sales. This, too, is obviously an undesirable situation.

We are making some progress in developing plans to reduce the size of the revisions in retail sales. The 10-day estimate, which is always in great demand as an early and sensitive economic indicator, will be tested on a new sampling basis. We are hopeful that this innovation will provide a great step forward from the present simple aggregation of weekly figures to obtain an early monthly total. Also, there are plans for expediting the 35-day estimate by modernizing procedures of collection and transmittal of reports. Finally, additional research is in progress for improving regression techniques to account for reporting bias and for developing better methods to estimate sales on a current basis.

Output Indicators Inconsistent

A final example of the need for improvement in our basic statistics concerns the amount of economic growth that has occurred in the recent past and that can be made a reasonable policy objective in the future. Recently, there have been inconsistencies in the movements of two official measures of the behavior of real output in the U.S. economy, namely, the index of industrial production, which is compiled by the Federal Reserve Board, and gross national product in real terms, which is produced by the Department of Commerce. Let me briefly summarize the recent record.

In the first quarter of 1969, the real GNP rose more than 2 percent (at a seasonally adjusted annual rate) and the production index increased by nearly 7 percent (at a seasonally adjusted annual rate). In the second quarter, the corresponding figures were: real GNP up by 2 percent and industrial production up by nearly 6 percent. In the third quarter, the real GNP again rose by 2 percent, while industrial production receded to an increase of less than 4 percent. In the fourth quarter, the real GNP showed no growth at all, but industrial production declined by 6 percent (at an annual rate). While the two series do not measure exactly the same areas of the economy—for example, industrial production does not include agriculture, construction, or Government—these differences exceed the range to be expected from the two series.

The first half of 1969 was a period when economic policymakers in the Administration were watchfully waiting for the first signs of slackening in economic activity in response to the policy of restraint. Not surprisingly, it was frustrating, if not unnerving, to compare the behavior of real GNP—which showed some slowing down in growth—with industrial production—which did not. Admittedly, there are differences in definition, coverage, weighting, and seasonal adjustments between real GNP and industrial production, but these are not so great as to explain the diversity of behavior that prevailed during the first half of 1969. In part, the inconsistencies between the two series could be reduced by improvements in the monthly survey conducted by the Census Bureau on manufacturers' shipments, inventories, and new orders. Much can also be done by working on the problems presented by individal series to make them as functional as possible.

Data Systems Are Being Upgraded

To provide some added help to economic analysts and forecasters, we have in the past year taken a number of important steps to improve the Federal statistical system. One such step has been to make information available to the public as promptly as possible. A year ago, when the President issued his memorandum requesting that compilation and release of statistics by Government agencies be carried out without unnecessary delay, the Budget Bureau monitored this directive by instituting a comprehensive program to expedite the processing and release of Government statistics. Advance release schedules for all important series are now available from the statistical agencies and the Bureau of the Budget.

The Federal Government is also taking vigorous action to assure that economic data are available before major policy decisions are made.

Government alone, however, cannot do all that is needed. We must enlist the aid of the business community in this effort. Many key economic indicators cannot be published promptly because respondents' reports are often sent in too late. Among the economic indicators not published promptly because of slow reporting are manufacturing and trade inventories, manufacturers' shipments, construction expenditures, and corporate profits. The business community can help immeasurably in solving this problem by speeding up the submission of reporting forms. We recognize that prompt reporting may involve some additional costs to the business community, but the business community has very much to gain by more up-to-date figures.

BoB Has Leading Role

The major responsibility for motivating and coordinating the Federal Government's statistical activities is lodged in the Bureau of the Budget. As a result, we have taken a number of steps recently to exercise guidance and leadership in relation to the Federal statistical agencies, including the formation of two important interagency committees. The first is the Committee on Federal Statistics, which was established as a standing subcommittee of the Cabinet Committee on Economic Policy. This committee provides guidance on major matters of statistical policy and on needs to be met by the Federal statistical system on information required for public policy decisions, program formulation, and administration. I serve as chairman of this committee whose members are drawn from the policy level of several Departments with major statistical responsibilities.

In addition, an Interagency Committee on Statistical Programs and Policy has been established, under the chairmanship of the assistant director for statistical policy, to advise the Bureau of the Budget on major issues confronting the Federal statistical programs. This committee includes the heads of the major statistics-producing offices within the Federal Government. In its first meetings, this committee has given consideration to what is properly the full scope of Federal statistics, including general purpose statistics, program statistics, and statistics collected through research grants and contracts.

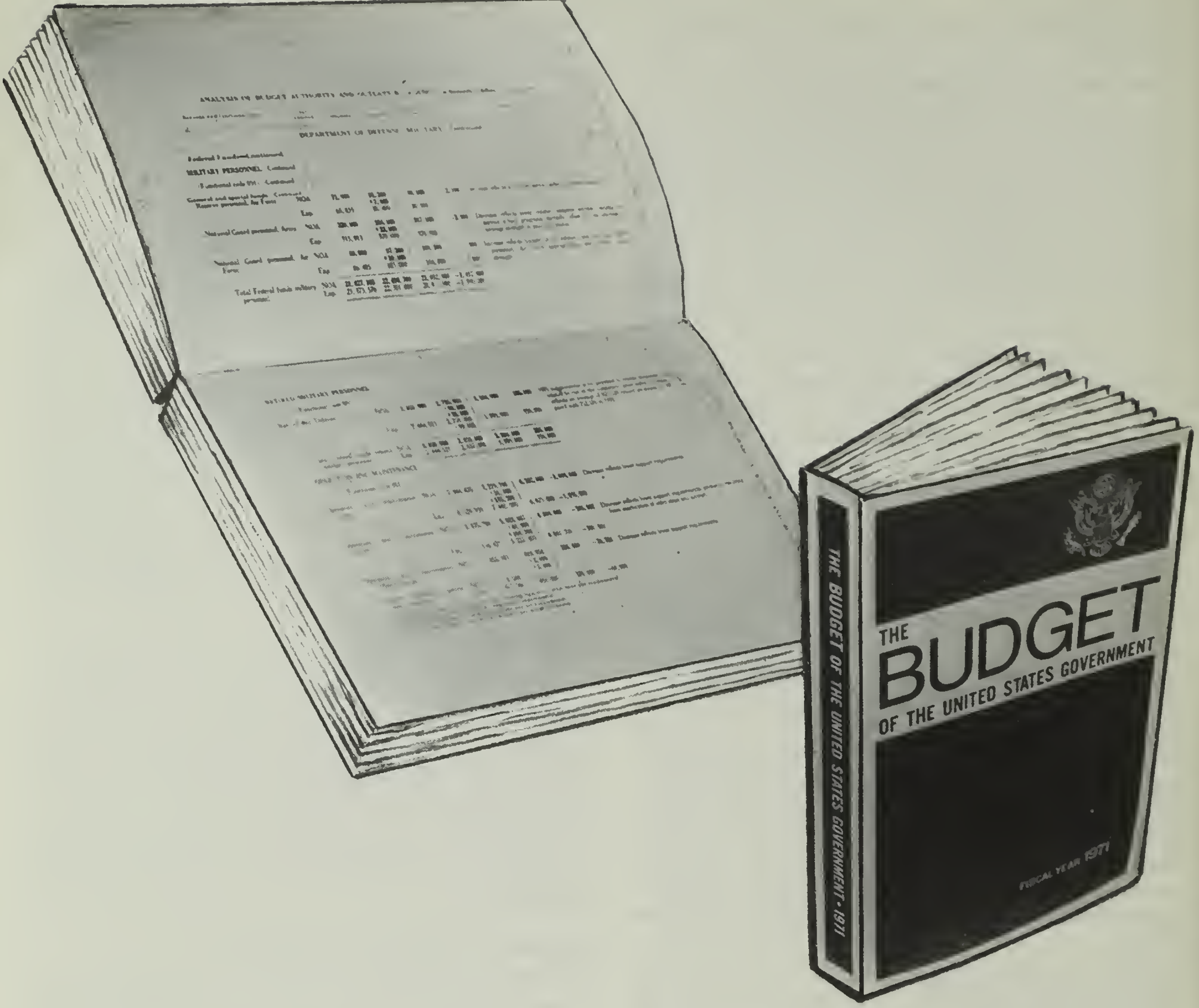
Budget Director Robert P. Mayo has brought into the Budget Bureau as head of the Office of Statistical Policy Julius Shiskin, who has an international reputation as an economist and statistician. While he is best known for his work on seasonal adjustments and cyclical indicators, Mr. Shiskin has also had many years of experience in large-scale data collection and processing at the Bureau of the Census. He has taken over a highly competent and experienced staff and has added a number of highly regarded younger people. They have already taken steps to increase the effectiveness of the Office of Statistical Policy in its role within the Budget Bureau, in its relationship to data-producing Federal agencies, and in its relationship to users of Government statistics.

Because many of the improvements needed in the basic information system are of a very fundamental nature affecting the content of statistics, the organization of statistical activities, and the relationship between fact gathering and the burden to respondents, the time is most opportune for a fundamental review of the entire Federal statistical system. In the course of such a review, which should be undertaken in the near future, we expect that a new look will be given to the strategic role of Federal statistics in rational decisionmaking in the 1970's.

Danger in Shortchanging Statistics

In the final analysis, it is likely that significant improvement in Federal statistics will involve a more liberal funding of various programs in order to beef up the capability of the agencies producing statistics. At present, the cost of the entire Federal statistical system is less than $200 million, which represents about one-tenth of 1 percent of total Federal budget outlays and an almost invisible portion of total GNP. We are playing "Russian roulette" with our economy by failing to put a higher price tag on the value of good statistics. It seems to me that there is a reasonable price we should be willing to pay for information which will help us avoid the possibility of incurring higher costs and possible serious harm to the economy.

I am not suggesting that merely spending more dollars is the only solution to the problem of good statistics. We also have an opportunity to cut out those statistical efforts and programs that are either out of date or are unneeded. By so doing, we can release resources and redirect them into more productive uses, thereby strengthening the Federal statistical system. ☐


THE BUDGET OF THE UNITED STATES GOVERNMENT · 1971
THE BUDGET OF THE UNITED STATES GOVERNMENT
FISCAL YEAR 1971

THE DEFENSE BUDGET

By ROBERT C. MOOT
Assistant Secretary of Defense (Comptroller)

THE DEPARTMENT of Defense budget for 1971 was greeted with mixed reactions when, as part of the total Federal budget, it was transmitted to the Congress in early February. The U.S. news media gave prominent attention to the fact that significant reductions had been made in defense in order to combat inflation, poverty, crime and pollution. In some quarters, concern was expressed that perhaps the defense cuts were too severe and were jeopardizing national security. On the other hand, charges were also raised that the defense program really has not been reduced at all, and that the budget figures were misleading. Predictably, the Soviet news agency TASS reported that "as in previous years, the lion's share of allocations goes to military needs."

The fact is that the Department of Defense budget for fiscal year 1971 represents a sharp decline in defense spending. It is the first budget that has been completely prepared by the Nixon administration. It was

> *This anti-inflationary budget begins the necessary process of reordering our national priorities. For the first time in two decades, the Federal Government will spend more money on human resource programs than on national defense.*
>
> RICHARD NIXON.
>
> *February 2, 1970.*

built upon major changes in defense policy that resulted from intensive study and review throughout 1969. Some of these efforts were particularly designed to weigh military requirements against the increasingly pressing domestic problems that exist in the United States. The fiscal year 1971 defense budget is the lowest percentage of the gross national product since 1951, and the lowest percentage of the total Federal budget since 1950.

By any standards, the DoD budget remains sizable. Spending for 1971 is estimated at $71.8 billion, which is more than the combined sales of the five largest industrial corporations in the United States. The employment figures are even more dramatic. In fiscal year 1971, the Department will employ over 4 million people, which exceeds the combined employment of the 20 largest corporations. However, even these comparisons reveal a marked change. For example, just 2 years ago, the Department of Defense employed more people than the 30 largest corporations.

The DoD Planning-Programing-Budgeting System

Before examining the specifics of the fiscal year 1971 budget and significant changes that it contains, it is useful to review the key elements of the planning-programing-budgeting system (PPBS) as revised by the new Administration. The planning-programing-budgeting system is the means by which the budget is developed. Because of this, changes to the PPBS may have a more lasting impact on the Department of Defense than the absolute budget totals for any given year.

The revised PPBS requires a full 15 months from the issuance of the first document in the cycle until the budget is finally presented to the Congress. Therefore, the full cycle could not be used for the fiscal year 1971 budget simply because insufficient time was available. Secretary Laird and Deputy Secretary Packard took charge of the Department in late January 1969 and the budget had to be printed in final form in early January 1970. In addition, a few months were required at the beginning of the new Administration to develop the basic structure of the revised system. The important changes were jointly developed by the Secretary and Deputy Secretary of Defense, the service secretaries and the Joint Chiefs of Staff. Due to these time limitations, a truncated PPB cycle, containing most of the features of the revised system, was followed to develop the fiscal year 1971 budget.

The Normal Cycle

Hereafter the PPB cycle will begin in October and will end in January, 15 months later. It consists of nine basic steps that are executed over this period of time. This means that the initial planning steps are taken almost 2 years before the fiscal year under consideration begins, and almost 3 years before it ends. Careful planning and forecasting are required, both to design a proper defense program and to provide adequate resources for it.

Chart 1 is a schematic of the over-all system. As the chart shows, the 5 year defense program (FYDP) continues to provide the central focus of the system. The main objective of the cycle is to update the FYDP, which then serves as a firm basis for the budget. The FYDP contains planned forces for 8 years, and associated costs and manpower for 5 years. During the cycle, the level and mix of forces are carefully reviewed and resource requirements are adjusted as needed.

Military Strategy

The annual cycle begins with an evaluation of intelligence estimates and a review of the policy determinations of the National Security Council. Both at the outset and at several key points later in the cycle, specific provision has been made for National Security Council input. In October the Joint Chiefs of Staff issue volume I of the joint strategic objectives plan (JSOP). This is the first step. This document includes national and international security objectives, military strategy concepts, and principles for the employment and support of military forces. The JSOP has always been a part of the system, but it is now issued earlier than before. In October 1969, volume I of the JSOP was published by the JCS, covering fiscal years 1972 through 1979.

A new document has been added to the cycle, which contains the results of an OSD review of volume I of the JSOP. This document is the second step, and is a Secretary of Defense memorandum titled "Strategy Guidance." It updates and enlarges on the strategy proposed by the JCS and includes changes in national security objectives and the latest guidance from the President and National Security Council. The strategy guidance memorandum will normally be issued for comment to the JCS in early December. A revised strategy guidance memorandum will be issued around the middle of January. This year however, due to the extent of National Security Council input, only the January issue was published after review by the JCS.

Fiscal Guidance

The third step is an important part of a very basic change to the planning-programing-budgeting system.

On January 15, a Secretary of Defense memorandum titled "Fiscal Guidance" is issued for comment. Fiscal guidance is provided to each military department and defense agency. The fiscal guidance is in terms of major mission and support categories, and includes the budget year plus 4 program years. The assumptions that underlie the guidance are also identified. In both developing and revising the guidance, consideration is given to the strategy guidance memorandum, the current budget, the FYDP, program deferrals, inflationary trends, gross national product estimates, and other economic factors.

The Department of Defense has been planning and budgeting on an unconstrained "requirements basis" for most of the 1960's. The practice has been to determine what is required without regard to the availability of resources. Economic reality was introduced into the process during the latter months of the cycle just before the President's budget was finally completed. Under this former system, with planning geared to a two-major and one-minor war requirement, most of the PPB cycle was spent in working on plans with total costs well in excess of $100 billion. This always proved to be unrealistic, so that at the very end of the annual cycle, $20 billion or more had to be cut from the budget. The budget review was a traumatic process, because a great many major decisions had to be made in about 6- to 8-week period. Instead of finely tuning and balancing the Department's plan for the budget year, the plan received a major alteration at the 11th hour.

Generally the items removed from the budget at the 11th hour were not deleted and forever forgotten. On the contrary, these items represented valid requirements, so for the most part, they were "deferred" until the following year. The FYDP would be changed to reflect this, and the year following the budget year would quickly become swollen with deferred items, which recreated the problem of an unrealistic planning base all over again.

As mentioned earlier, the fiscal guidance covers a 5-year period, and the numbers are as realistic as they can be made. In this way, the outyears, or years beyond the budget year, are also fiscally constrained and should remain realistic. This fiscal guidance should effectively eliminate the so-called "bow wave" in the FYDP. i.e., the high numbers in the year immediately following the budget year. The total fiscal guidance for each program year and for each DoD component is considered firm, although changes can be proposed when the fiscal guidance is issued for comment.

Getting the system started and developing the initial guidance is difficult. However, issuing fiscal guidance next year and in future years will be somewhat easier, since only one additional year must be added. For example, in next year's fiscal guidance, fiscal year 1973 to 1976 will actually be updated from this year's fiscal guidance as indicated by the over-all environment and the results of the fiscal year 1972 budget review; only fiscal year 1977 will be new.

JCS Force Recommendations

During the time that the fiscal guidance is being commented on and revised. step 4 takes place. This is the issuance of volume II of the JSOP in February, which contains the JCS evaluation of the forces, manpower, and costs required to execute the strategy contained in volume I of the JSOP. This document also highlights the major force issues requiring decisions in the current year. The JSOP volume II is not constrained by the fiscal guidance, although it is issued a few weeks after the tentative fiscal guidance has been published. Actually, volume II is under preparation long before the fiscal guidance is known, and is controlled only by the strategy contained in volume I, together with any modification contained in the Secretary of Defense strategy guidance memorandum.

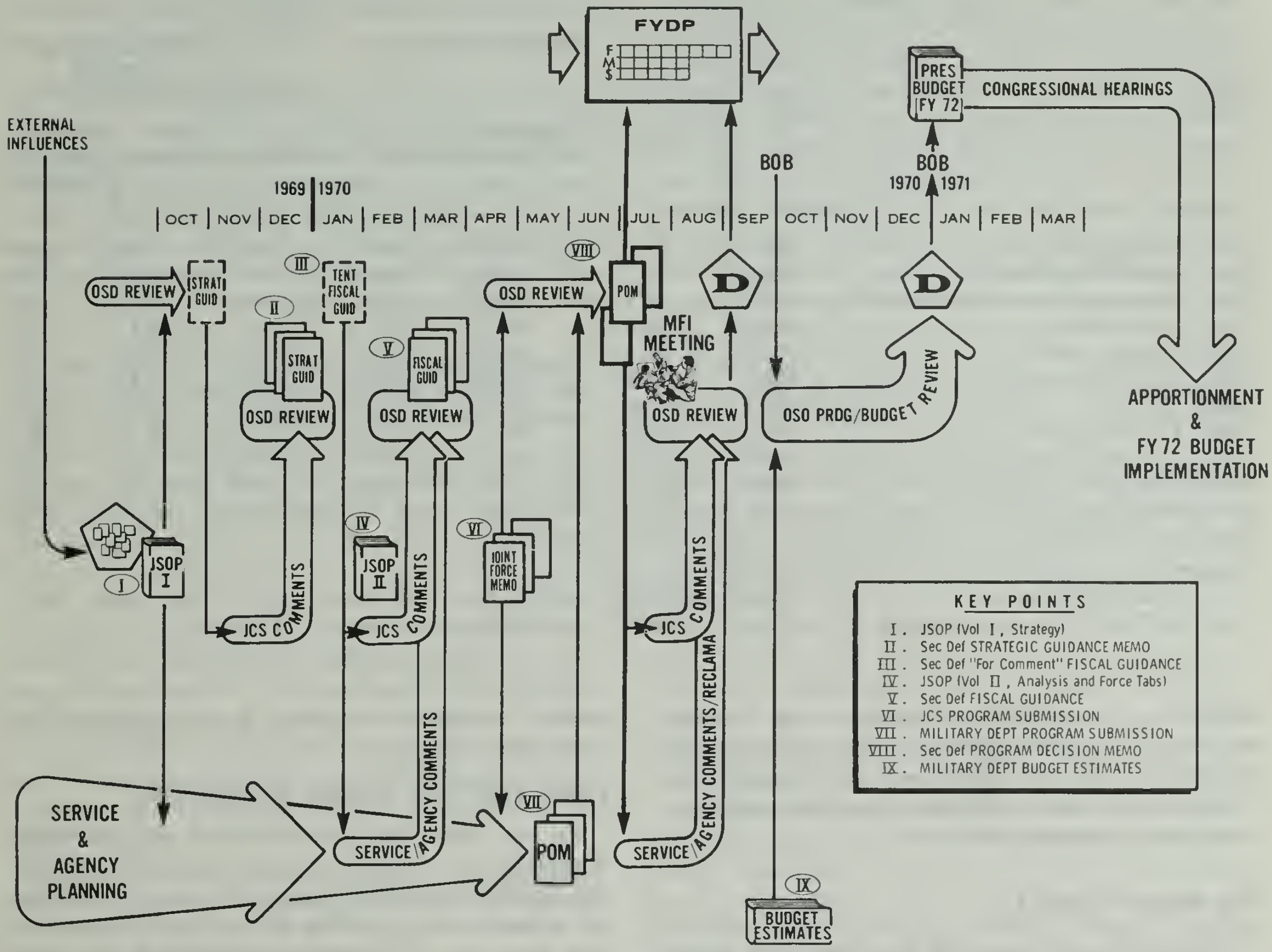
The contents of JSOP volume II are considered by the Secretary together with JCS and component comments in developing the revised fiscal guidance. Step 5 is the revision of fiscal guidance, issued in early March. A "Logistics Guidance" memorandum, which is issued for comment just after the final strategy guidance memorandum, is also published in final form at this time by the Secretary of Defense.

Step 6 is another key change. In mid-April the Joint Chiefs of Staff publish the joint force memorandum, which is in the same format as volume II of the JSOP. However, in this case, the forces must be within the parameters of the fiscal guidance provided in early March. If the fiscal guidance is less than required by JSOP volume II, this document will also contain an assessment of the risks associated with reducing the forces to the constrained level. The key point is that the mix of forces will be constructed by the Joint Chiefs of Staff within a fiscal limtiation that is as realistic as it can be made.

The POM-Vehicle for Economic Analysis

The joint force memorandum is provided simultaneously to OSD, the military departments, and defense agencies. In mid-May, each military department and defense agency submits a single program objective memorandum (POM), which is a comprehensive and detailed expression of that component's total resource requirements. The POMs reflect the guidance given in the joint force memorandum, the JSOP, the strategy guidance, and fiscal constraints. The POM, which is step 7, must be separated into segments of major mission and support categories conforming to the categories expressed by the Secretary of Defense fiscal

Chart 1.—Planning-programing-budgeting cycle



guidance memorandum. Supporting information is primarily in program element detail.

The program objective memoranda correspond to the draft presidential memoranda and associated PCRs of the former system. However, instead of containing the analysis and presentation performed by the OSD, as was done with the DPMs, the POM is a *service* document and is reviewed and commented upon by OSD. Economic analysis can be of great benefit to the services and agencies in the development of the POM, providing the maximum program possible within the funds available.

Starting in July and based upon the program objective memoranda, the Secretary of Defense issues a series of program decision memoranda. The Joint Chiefs of Staff and the service secretaries may comment on these decisions and hold meetings in mid-August with the Secretary to discuss major force issues not yet resolved. Following these meetings, the last of the revised program decision memoranda are issued, and the FYDP is updated. This represents the eighth step in the cycle.

The Budget Review

As the ninth step, the DoD components submit budgets on September 30 that are based upon the FYDP as revised. The budget is reviewed jointly by the Office of the Secretary of Defense and the Bureau of the Budget, and budget decisions are made by the Secretary of Defense. Final issues will be reviewed with the President, and the budget will be transmitted to Congress in January.

The joint review of the budget by OSD and BOB has been criticized by some who fear that the Bureau analysts lose their independence. Nothing could be further from the truth. This review provides the Bureau with excellent visibility into defense programs, budgets, and costs. The Bureau uses the same data as OSD, but maintains independence in reaching conclusions and recommendations. The Bureau does raise budget issues with the Secretary of Defense or the President as the Director deems appropriate. When such issues are raised with the President, the decisions are not invari-

Chart 2.—*Defense budget, Federal budget, and GNP for selected years*

[Amounts in billions of dollars]

Fiscal year		GNP	Federal budget outlays				DoD outlays as percent of:	
			Net total	Department of Defense	Other	Offsets	GNP (percent)	Federal budget (percent)
1940	Pre-world War II	$95.0	$9.6	$1.6	$8.0	NA	1.6	16.3
1945	World War II peak	216.8	95.2	79.9	15.3	NA	36.8	83.9
1950	Lowest year since World War II.	263.3	43.1	11.9	31.2	NA	4.5	27.7
1953	Korea peak	358.9	76.8	47.7	29.1	NA	13.3	62.1
1961	Ten years ago	506.5	97.8	44.6	55.7	−2.5	8.8	44.5
1964	Last prewar year	612.2	118.6	50.8	70.7	−2.9	8.3	41.8
1968	SEA peak	822.6	178.9	78.0	105.5	−4.6	9.5	42.5
1969	Last actual year	900.6	184.6	78.7	111.0	−5.1	8.7	41.5
1970	Johnson budget	960.0	195.3	81.6	119.4	−5.7	8.5	40.6
1970	Current estimate	960.0	197.9	77.0	127.0	−6.1	8.0	37.7
1971	Budget estimate	1,020.0	200.8	71.8	135.6	−6.6	7.0	34.6
1971	In 1964 dollars			54.6				
Changes:								
	1964 to 1971	+407.8	+82.2	+21.0	+64.9	−3.7		
	1969 to 1971	+119.4	+16.2	−6.9	+24.6	−1.5		

ably in favor of the Defense Department. As a secondary benefit, the joint review is a means of shortening the PPB cycle. Because of the size of the defense budget, a sequential review would add several months to an already-long planning horizon.

Four Major Changes

To summarize the impact of the revised PPB system, I believe there are four major changes. The first is the fiscal constraint, which has changed departmental planning at its very roots. Economic realism is now introduced at the earliest feasible stage, and everyone in the organization is forced to think about priorities throughout the process instead of just a few people at the end of the cycle. Second, the Joint Chiefs of Staff are involved for a longer period of time, and their views on forces, priorities, and risks, as expressed in the joint force memorandum have a key role in the development of the FYDP. Third, the cycle is longer by about 4 months. This provides an opportunity for a more active dialog among the services, the JCS, and OSD, to get the full benefit of the best thinking in the Department. As the chart shows, this has been amply provided for in the revised system. Finally, the responsibility for analytical input has been shifted to the services. It is easy, perhaps, to overlook the significance of this change. It requires the services to think systematically about alternatives to current and planned programs. The services must challenge their own programs, design the structure of the analysis, perform the needed research, and present their case in the program objectives memoranda.

Fiscal Year 1971 Budget Development

To the extent that time permitted, the philosophy underlying the revised approach was used in developing the fiscal year 1971 budget. In June, after extending the amount required for the Southeast Asia conflict into fiscal year 1971, and after including the July 1 pay raise and some other changes, the total obligational authority for fiscal year 1971 in the 5 year defense program was $88.9 billion. Fiscal guidance was introduced into the budget preparation process by Secretary Packard's memorandum of July 11, which reduced the overall total to $84.8 billion. This memorandum also established the $84.8 billion as a firm ceiling; unlike past years, there would be no addendum budget for items not in the FYDP, but the services and agencies would be given the flexibility to propose equal-cost-trades within their overall ceilings, subject to review.

As a result of efforts to reduce expenditures in fiscal year 1970 by $3 billion, the ceilings were revised downward to reflect the extensions of reductions into fiscal year 1971. This was done through the omnibus PCDs issued in late September, which brought the ceiling to $78.4 billion.

The budget submissions of the DoD components totaled $78.3 billion. It has been estimated that wihout a firm ceiling the budget submissions might have totaled as much as $115 billion. As a result of the budget review and the major force decisions, we are now targeted for a total obligational authority figure of $72.9 billion, and for a total expenditure figure of $71.8 billion. This does not include any allowances for pay raises during fiscal year 1971.

Shift in National Priorities

The fiscal year 1971 budget represents a dramatic shift in national priorities and the revised planning-programing-budgeting system was a key vehicle used to accomplish this change. To gain an appreciation of the extent of this shift, it is enlightening to review the relationship between the total Federal budget and the Department of Defense budget for selected years. This is shown in chart 2.

During World War II and the Korean war, rising expenditures for military purposes were partially offset by decreased expenditures for other Federal programs. As chart 2 indicates, military expenditures rose from 16.3 percent of the Federal budget in 1940, to 83.9 percent in 1945. This pattern repeated itself from 1950 to 1953 during the Korean war, with a rise from 27.7 percent to 62.1 percent.

The pattern was broken, however, with the Vietnam war. Instead of absorbing a greatly increased percentage of the Federal budget, military expenditures actually declined slightly as a percentage of the budget, from 41.8 percent to 41.5 percent. In absolute terms, the total Federal budget grew rapidly from 1964 to 1969. It was this pattern of increased Federal expenditures which led to President Nixon's statement in the budget message.

> The current inflation was generated by the mounting budget deficits and rapid monetary expansion that began in 1965 with the escalation of the Vietnam war and the massive increases in Federal spending for domestic programs.

The last few lines of chart 2 show the actual reordering of priorities that was accomplished in the fiscal year 1971 budget by President Nixon. Fiscal year 1969 can be used as a base year, since it was the last year in which spending was completely determined by the previous administration. In fiscal year 1969, military outlays accounted for 41.5 percent of Federal expenditures and utilized 8.7 percent of the gross national product. In the fiscal year 1971 budget, military outlays are projected as 34.6 percent of the total, a decrease of almost 17 percent, and the lowest percentage since 1950. Military outlays will utilize 7 percent of the GNP, which is the lowest percentage since 1951.

These percentages are very meaningful. The percentage of the total Federal budget shows the relative emphasis the President is proposing to place on the military spending versus other Government programs. The percentage of GNP gives a broader picture—it shows how much of our total national output he is proposing to use for military purposes in lieu of personal consumption and investment, as well as other Government programs. Both these percentages are the lowest they have been for two decades, and reveal a marked difference in priorities from recent budgets.

There are a number of ways of measuring the extent of the reductions that have been made. A straightforward approach is to note that outlays were $78.7 billion in fiscal year 1969, and are estimated at $71.8 billion for fiscal year 1971, for a total decrease of $6.9 billion. However, the forces purchased for $78.7 billion in fiscal year 1969 cannot be purchased in fiscal year 1971 for the same amount, due to pay and price increases. Growth in the number of people receiving military retired pay has also contributed to increased costs, and is a factor over which the Department has no control. These necessary increases amount to $5.9 billion from fiscal year 1969 to fiscal year 1971. When this is added to the actual $6.9 billion reduction, the total reduction in the real defense program from fiscal year 1969 to fiscal year 1971 is $12.8 billion.

The cost of inflation can perhaps be best appreciated by comparing the changes in payroll costs and personnel strengths over the past 2 years. In fiscal year 1969, total DoD pay and related costs were $35.4 billion, and military and civilian strength totaled 4,734,963. In fiscal year 1971, pay and related costs will rise to $35.8 billion while the total end strength figures will drop to 4,053,255. Stated another way, in 2 years inflation has cost the Department 681,708 people and $0.4 billion. Although of lesser magnitude, inflation has also had a similar impact on all other costs.

The final point that should be brought out on chart 2 is the fiscal year 1971 defense budget in fiscal year 1964 dollars. This figure is $54.6 billion. Actual defense outlays for fiscal year 1964 were $50.8 billion. Although the fiscal year 1971 budget is $21 billion higher than the fiscal year 1964 budget, the real increase is only *$3.8 billion*. With only this increase, DoD is supporting the costs of the war in Vietnam and the associated higher force, material consumption, and attrition levels.

Summary

The Department of Defense budget reveals that a positive shift in national priorities has taken place. In terms of impact on the economy and as a share of the total Federal budget, the fiscal year 1971 defense estimates are far below prewar levels, and even further below fiscal year 1969. The budget is the best single expression of our goals and our programs. The message in the fiscal year 1971 budget is not hard to find, for the numbers speak for themselves. The hard choices among the alternative uses of resources have not been avoided. The result is a budget that will enable the United States to meet international responsibilities by seeking an honorable peace in Vietnam, and by maintaining sufficient military power to deter potential aggressors. It will also permit us to initiate important domestic programs and to help restore economic stability without income or excise tax increases. □

> *"I am sure readers are aware of the national furor which followed the oil well drilling leak off the California Coast near Santa Barbara. Aesthetically for sure, and ecologically in all likelihood, it was a disaster situation. And yet the Santa Barbara incident could appear trivial compared to the scope and impact of a spill or fire involving a contemporary supertanker."*

Economics, ecology and the exploitation of transportation technology

BIGGER BULK CARRIERS *versus* U.S. HARBOR DIMENSIONS

As a maritime nation, the United States is inextricably bound up in a world-wide ocean shipping revolution.

The revolution has two major facets: the near-exponential growth in the size of bulk cargo carriers, and the rapid development of cargo containerization. It is the first facet which is of particular concern to the U.S. Army Corps of Engineers, which is the Federal agency responsible for providing channel and harbor facilities associated with the development of port and harbor areas. I shall try to illustrate the principal dimensions of the problems the nation faces in moving to accommodate supersized bulk carriers and why some form of regional analysis of deepwater navigation improvements appears necessary.

Harbor and Channel Depths

During the earliest years of the nation's history, Federal interest in navigation improvements tended to concentrate on inland requirements. This initial focus was appropriate. Given the vessel technology of the time, coastal harbors in their natural conditions were generally adequate. Even so, Federal investment in harbor and supporting facilities dates from 1789. In that year, Congress authorized the Federal Treasury to assume the costs of lighthouses, beacons, buoys, and public piers which had been erected by the colonial governments.

As with the development of the national frontier and economy, the Federal program for harbor and channel work largely followed a "natural" course. No attempt was made to spell out a formal, long-range program or schedule for harbor improvements. Harbor and channel facilities were investigated, benefits and costs calculated, and projects carried out in response to evolving economic and trade conditions and to meet dispersed and relatively independent area needs. Studies were assigned to the Corps of Engineers on an intermittent basis by Congress, either in the form of individual survey resolutions, or embodied in the River and Harbor Acts which have been passed on a regular basis since 1826.

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The principal Federal concern has been with the adequacy of harbor and channel facilities for commercial trade. To date, the Federal Government has assisted in the development of over 500 commercial port areas. Many of these have experienced a number of separate authorizations and incremental improvements. As a result of this work, depths of 35 feet now generally prevail at major harbors on the Atlantic and Gulf Coast, ranging up to 45 feet in portions of New York Harbor and the Port of Hampton Roads, Virginia. Depths of 30 to 40 feet are generally available in principal Pacific Coast harbors, though Pudget Sound has natural depths of over 100 feet. The 27-foot depth of the St. Lawrence Seaway is controlling for the Great Lakes navigation system; 60 harbor projects with depths ranging from 15 to 27 feet have been authorized for that region.

Trends in Size of Bulk Carriers

Growth in the cargo-carrying capacity of deep-draft petroleum vessels has been steadily on the rise since World War II and has shown an exceptionally significant increase during the past decade. In 1945, the standard size petroleum vessel was the 16,600 deadweight ton (dwt) [1] tanker known as the "T–2." Two years later, the first U.S. supertanker,[2] 28,000 dwt, was constructed. By 1956, eleven U.S. tankers between 30,000 and 35,000 dwt were in service.

The average size tanker in the world fleet increased from 12,800 dwt in 1949 to 27,100 dwt in 1965. The trend toward larger volume ships accelerated during the past decade. In 1966, over one-third of the world tanker fleet was composed of vessels 30,000 dwt or larger and comprised about 64 percent of world tanker fleet dwt capacity.

The trend is most strikingly illustrated, however, by the most recent statistics. According to the American Institute of Marine Underwriters, the average dwt of tankers delivered in the first half of 1967 was 74,766 tons; tankers on order July 1, 1967 averaged 112,076 dwt.[3] Further ship growth is in immediate sight. For example, tankers presently on order for registry under the Liberian flag average 196,770 dwt; for Japanese registry, they average 173,536 dwt.[4] Some vessels now operating exceed 200,000 dwt; the first 312,000 dwt supercarrier just recently entered operation. An industry source has recently estimated that as early as 1972 there will be about 150 tankers of the 200,000- to 300,000-dwt size operating in worldwide trades.

Dry bulk vessels, which transport commodities such as iron ore and grain, have not grown in size at the same rate as their tanker counterparts. (On occasion, however, petroleum tankers are used to haul other bulk goods, such as grain.) Nevertheless, the number of vessels 30,000 dwt and larger now in service comprise about 16 percent of the world's dry bulk carrier fleet, compared to less than 2 percent in 1953. Such vessels represent at present about 40 percent of the world's fleet dry bulk tonnage capacity. Again, however, the most impressive data pertain to recent or current construction. Dry bulk vessels delivered in 1967 averaged 41,600 tons; in mid-1967, those on order included 100 carriers exceeding 60,000 dwt.[5] The average size of 454 bulk carriers on order as of early calendar year 1968 was 46,195 dwt.[6]

There is a great deal of resemblance between the basic design of a 200,000-ton supertanker and that of the T–2 tanker. The most distinguishing mark of the new ships is their economics, a startling application of economies of scale. Since the capital and operating cost per ton of vessel deadweight reduces substantially as vessel size increases, marked savings in delivered unit costs result. Figure 1 illustrates the point. A specific

Construction of Lock and Dam #18, part of the multiple-purpose development of the Arkansas River, is inspected by the author (center).

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[1] Deadweight ton identifies a ship's total carrying capacity including internal provisions, at salt water, summer load line immersion. Actual cargo capacity is slightly less. For example, a 50,000 dwt tanker can carry about 47,000 tons of crude petroleum.

[2] The term "supertanker" changes meaning with each new generation of vessels.

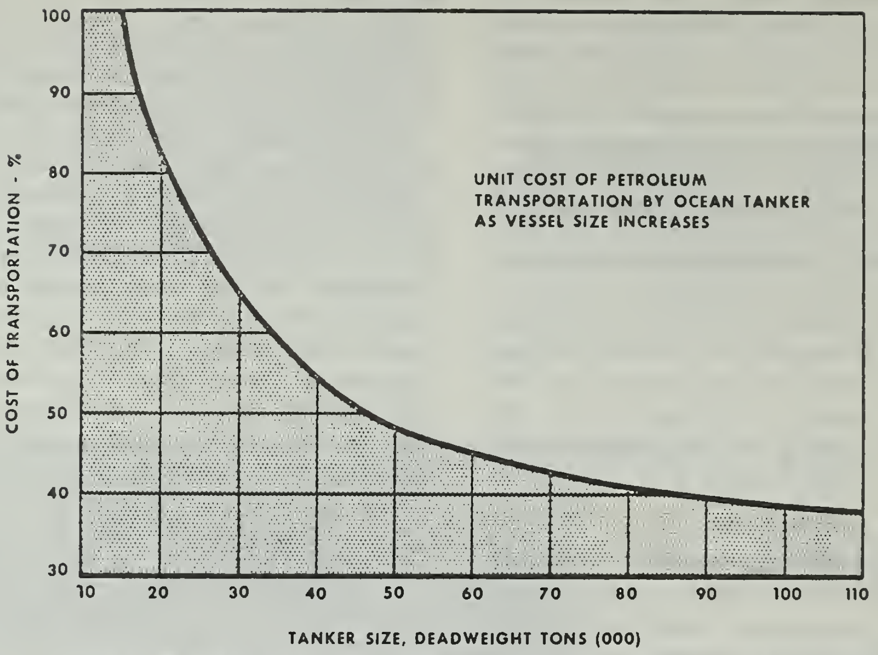
[3] Figures cited by Carl E. McDowell, American Institute of Marine Underwriters in a presentation to 13th Annual Tanker Conference, American Petroleum Institute, Williamsburg, Virginia, 6 May 1968.

[4] "World Ships on Order," *Fairplay Magazine* (International Shipping Journal), London, February 1969.

[5] Carl E. McDowell, *op. cit.*

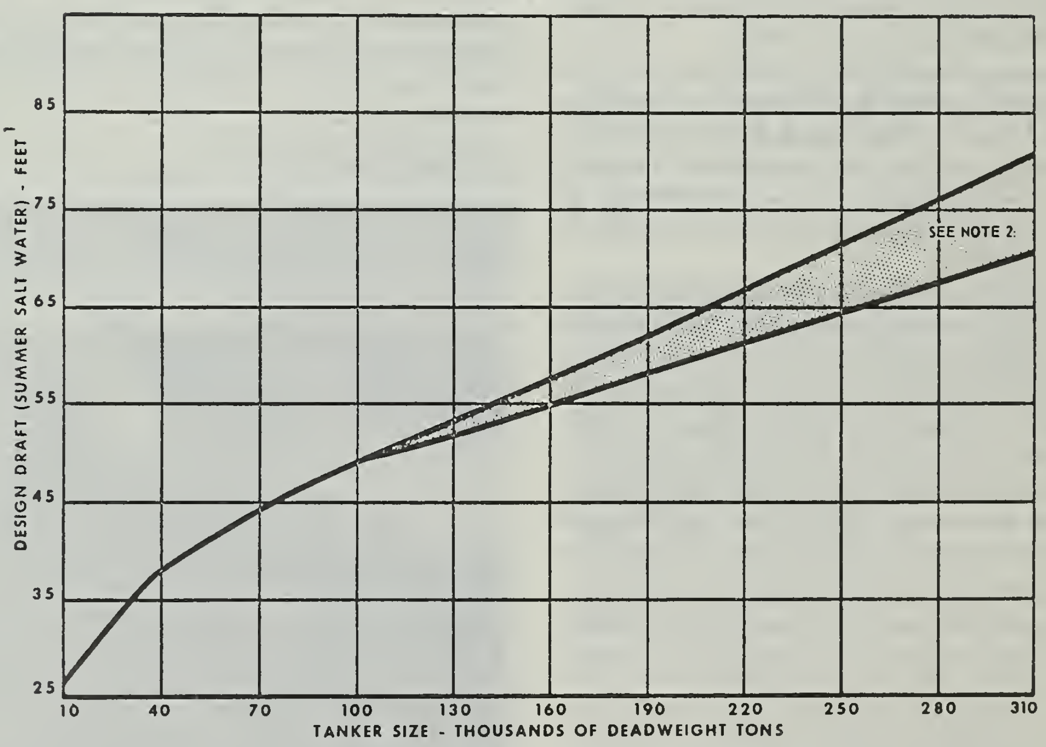
[6] *Fairplay Magazine, op. cit.*

Figure 1.



SOURCE: DEPARTMENT OF ARMY, CORPS OF ENGINEERS. TOTAL UNIT OPERATING COSTS OF A T-2 TANKER, INCLUDING CAPITAL COSTS, WERE TAKEN AS EQUIVALENT TO 100 PERCENT. COSTS FOR LARGER VESSELS ARE RELATED TO THIS AS A PERCENT OF THE T-2 COSTS.

Figure 2.



NOTE: 1 FOR SAFETY PURPOSES REQUIRED CHANNEL DEPTHS MUST GENERALLY BE 5 TO 10 FEET GREATER THAN THE MAXIMUM DRAFT OF VESSELS USING THE CHANNEL.

2 BEYOND 100,000 DWT. DATA AVAILABLE INDICATES A RANGE OF POSSIBLE DRAFTS DEPENDING UPON THE DESIGN CHARACTERISTICS OF THE VESSELS INVOLVED.

SOURCE: DEPARTMENT OF ARMY, CORPS OF ENGINEERS.

example of transport savings made possible by the supertankers is the planned movement of bulk petroleum from the Persian Gulf to Bantry Bay, Ireland, via the Cape of Good Hope in 312,000-dwt vessels. The firm chartering the vessels has estimated that although the trip is 13,000 miles longer than the Suez Canal route, the new carriers will enable transport of oil around the African Continent at approximately one-half the operating cost per barrel that would be incurred in shipping the oil through the Suez Canal in 50,000-ton ships.

Implications for Harbors and Terminals

The increasing size of cargo carriers has important implications for harbor and channel depths. During the 1940's, the T–2 tanker (16,660 dwt) was used as a yardstick for determining that a depth of 35 feet was required at major U.S. ports. But tankers of 35,000 dwt required 40-foot depths and necessitated further enlargement of harbors and channels. The largest tankers in service at the present time need at least 63 feet to accommodate them. Depths exceeding 70 feet will be required to accommodate ships in the 300,000 dwt class. Figure 2 shows dwt-draft relationships.

At present, there are only three port locations in the United States where a vessel in the 100,000-dwt size range can be fully loaded at berth: petroleum berths at Los Angeles and Long Beach, and a grain berth at Seattle.

Another implication of the supercarrier is for the landside-terminal requirements. The tremendous one-trip volume of commodity deliveries associated with supercarriers also requires an expansion in supporting facilities, such as oil tank farms or grain storage areas. The inland distribution or "feeder" transportation network may also require modification to insure properly timed receipt or prompt dispatch of the huge commodity loads.

Obstacles to Harbor Deepening

Factors most likely to influence analysis of future improvements to accommodate supercarriers include the prospect of sharply increased financial costs and the increasing range of associated costs, environmental and ecological, having an influence on benefit-cost calculations.

Dislocations and Major Relocations. Perhaps the most significant restraints on major enlargement of harbor and channel facilities, nationwide, are the costs which would be involved with relocations or dislocations. At the majority of harbors throughout the country, extensive developments have grown at the water's edge. In many instances, this growth has progressed to the point where harbor or channel deepening, which must be accompanied by related widening of the navigation facility, would require removal and relocation of industrial, commercial and residential structures. For example, at the Port of Oakland, Calif., substantial deepening would result in very high costs for modification of Army and Navy waterfront facilities as well as the densely developed city waterfront area. The present Chelsea River Channel in Boston Harbor is dredged nearly berth-to-berth in several locations, and dislocations would become a serious problem if the channel were greatly deepened.

Other formidable restraints can be illustrated. At Lake Charles, Louisiana, oil wells located on top of and adjacent to the banks of the Calcasieu River and Pass Channel would have to be relocated if the navigation facility were enlarged. Major land transportation facilities—most notably highway tunnels—represent potentially costly relocations at many ports. Highway facilities pass beneath principal navigation channels in the port areas of Oakland, Baltimore, Mobile, Norfolk, New York and Houston. The restrictive impact of such obstacles will vary from port to port, of course, but clearly it takes substantial shipping-cost savings to justify major relocations.

Changing Construction Conditions. A very large proportion of the Nation's major harbors have been man-made through removal of silt deposits. The bottom of the soft overburden is being approached in many harbors and channels, most notably along the Atlantic Coast. Further deepening will have to be through rock, with significant increases in unit construction costs. Unit costs will vary between regions of the country, depending on the type of material encountered, but the general cost range for removing overburden is from $.40 to $2.50 per cubic yard, while the cost of blasting and removing rock normally ranges from $15.00 to $25.00 per cubic yard.

Another significant problem is posed by the contour of the continental shelf, particularly along the Gulf Coast. Along the Gulf, the continental shelf gets progressively wider, reaches farther out to sea, moving eastward from the Mexican border. Hence, the further east the port, the longer its entrance channel must be extended into the Gulf.

For example, at Port Isabel near the Mexican border, the natural 50-foot depth is only 2 miles offshore; at Galveston, it is 11 miles; and at Sabine Pass in East Texas, it is 28 miles offshore. As a result, if the offshore channel at Sabine Pass were to be deepened by only 4 feet, the approach channel would have to be extended for a distance of 14 miles. In addition to channel trenching costs, the lengthening of approach channels may sometimes necessitate the costly extension of protective stone jetties.

Spoil Disposal. Disposition of material excavated from harbors and channels, both in original construction and in maintenance, presents an increasingly serious problem which will be aggravated with further harbor widening and deepening. Port area residential and industrial development has already created an acute shortage of suitable, economical and aesthetically acceptable shore disposal areas. The aesthetic criterion is being assigned increasing weight by the public. Within 8 to 10 years, at present maintenance schedules, existing spoil disposal areas at many major ports will have been filled up. Channel maintenance or further development thereafter in those ports will require new, acceptable disposal areas—a formidable challenge. Construction of new disposal areas through the building of retention dikes, where feasible, may offer relief. Dike construction, of course, will run up the cost of spoil disposal, and therefore impact on the feasibility of harbor channel deepening and widening.

The alternative to controlled (land) area spoiling is disposal in deep water. Yet, this option is also encountering difficulties. The cost of moving a million cubic yards of spoil just one mile by hopper dredge is approximately $50,000. Beyond high financial costs, spoiling in deep water is also becoming an ecological concern. Care must be taken in offshore disposal to avoid increasing water turbidity damaging to fish and wildlife habitat. In the future, quality standards for interstate and coastal waters may also contain options for soil disposal. In summary, the disposal of material taken from harbors or channels increasingly entails a significant problem of yet undefined magnitude.

Environmental-Ecological Impacts. Major port and supporting navigation developments are in the coastal zone and estuarine environment. This zone has been defined as that part of the land which is affected by its proximity to the sea and that part of the ocean which is affected by its proximity to the land. It includes the inshore part of the continental shelf, ocean shoreline and estuaries with their marginal shores. Tides, waves and coastal currents mark this zone of frequently varying environment, which supports a multitude of plant and animal life. The Great Lakes coastal environment is similar in many respects except for the lack of salinity effects and near absence of tidal influences.

The coastal estuaries are rich biologically. In places, they are as productive as choice farmland. They are fertilized with inorganic nutrients which land runoff is continuously supplying, and are also enriched by the adjacent seas. The mixture of nutrients and salt and fresh water creates an environment conducive to the production of a great many species of aquatic life. Almost two-thirds of the United States harvest of commercial fisheries involves species that spend all or part of their lives in the estuaries. In addition to their commercial fish, shellfish and crustacean resources, estuaries and seashores support an abundance of fish and wildfowl species that provide an increasingly popular recreational harvest.

The estuaries and related shallows of the coastal zone are sensitive ecosystems. Knowledge is only gradually being developed about this complicated system involving the interaction of air, water, land and life. Current and future investigations of harbor and channel improvements must entail recognition of potential impacts on ecological processes and wildlife resources. Potential adverse impacts can add greatly to the total estimated cost of improvements, either in financial outlays for mitigation or in the loss of significant wildlife resources. These considerations add substantially to the complex job of evaluating navigation improvements, since present measurement tools or criteria may be of limited utility.

Care must also be taken that circumstances are not present whereby extensive deepening of harbors and channels would endanger fresh groundwater supplies. Fresh water that has collected in porous rock formations within surrounding layers of impervious rock is

Photo shows mallards overwintering in Duck Creek near Fort Peck Dam, Glasgow, Montana. As the fundamental natural resource, water—by its presence, absence, quantity or quality—plays a major role in determining the biological and physical, aesthetic and economic, social and cultural aspects of the environment.

Debris is responsible for an annual $7.5 million of damage to vessels in New York Harbor alone. Specially converted or designed vessels, such as the new 30-foot boat which scoops driftwood out of the Potomac River with a hydraulic lift, are employed in collecting the debris from New York Harbor, San Francisco Bay, Baltimore Harbor, and the waters of the Potomac and Anacostia Rivers. In San Francisco Bay, where an estimated 10,000 cubic yards of drift are collected annually, vessels have collected as much as 120 tons a day.

often tapped for urban use. These underground supply sources, called aquifers, occasionally extend under harbors or channels. In such cases, harbor or channel deepening operations could damage the impervious layer of protective rock, permitting salt water to seep into the aquifers and thereby degrade or pollute municipal water supplies. Without an alternate water service, the deepening operation may need to be cut back, or deferred entirely.

A Case in Point

The current Delaware River situation gives an explicit illustration of the problems confronting us.

The Delaware River services the Ports of Philadelphia and one of the world's largest petrochemical complexes. The Ports utilize the existing 40-foot channel for handling a variety of cargoes, but bulk cargoes of petroleum products, ores and minerals are of dominant importance and undergird an important segment of the Delaware Valley's industrial livelihood.

A study is underway to determine the feasibility of deepening the channel to 50 feet. Preliminary estimates indicate about 330 million cubic yards of silt and rock would require removal, at a cost in the neighborhood of three-quarter billion dollars. The primary factors which are complicating the analysis include:

- Growth in average vessel size since the study was initiated in 1964. Even a 50-foot depth would be inadequate for a sizeable proportion of ships now under, or planned for, construction.
- Lack of readily accessible spoil disposal areas. Spoiling on existing tidal marshlands would eliminate fish and wildlife breeding and feeding grounds, which are becoming increasingly scarce in the Eastern United States.
- Risk of intrusion of tidal salt water above the points where water is presently withdrawn from the Delaware for municipal and industrial purposes. Modification of the fresh water-salt water interface might also induce damages to valuable oyster beds.
- Risk of damage to underground aquifers through blasting and removal of impervious rock which now protects aquifer water supplies.
- Potential alterations in patterns of shoaling, in both the river and estuary, which might be induced by major deepening of the channel.

The Corps' Philadelphia District has all these factors under study. In addition, the District has had continuing communications with the Delaware Bay Transportation Company, a consortium of eleven oil companies, which has been studying the feasibility of an offshore liquid bulk terminal in Lower Delaware Bay. The offshore facility would involve bulk storage in the Lower Bay area, with transshipment by barge or pipeline. Construction of an offshore facility would obviously influence decisions relative to further work on the Delaware channel. It could also influence future navigation requirements in the New York area.

The Critical Problem of Safety

I am sure readers are aware of the national furor which followed the oil well drilling leak off the California Coast near Santa Barbara. Aesthetically for sure, and ecologically in all likelihood, it was a disaster situation. And yet the Santa Barbara incident could appear trivial compared to the scope and impact of a spill or fire involving a contemporary supertanker.

Estimates of the amount of oil which escaped through the fissure of the continental shelf well between 28 January and 21 February range from a low of approximately 8,000 barrels to a high of ten times that amount. Whatever number is correct, the results were gruesome. Imagine the damage which could result if a 312,000-dwt carrier, such as are now operating, were to spill its cargo of 2¼ million barrels of oil. The cargo load would have the potential of saturating every foot of a 200-mile reach of shoreline with over two barrels of crude oil. Given such possibilities, I believe that safety considerations will be a critical, perhaps central, factor in future decisions on the location of supercarrier facilities and the conduct of management and inspection programs on the part of both industry and government.

Future Study Requirements

Taking advantage of supertanker transport savings in the face of physical constrictions at existing port

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This hydraulic model of San Francisco Bay and delta is built to a horizontal scale of 1 foot=1,000 feet and a vertical scale of 1 foot=100 feet. The model, which covers two acres, is used by engineers to analyze hydraulics problems.

areas will likely require the development of new kinds of facilities in areas providing greater natural depths.

Offshore facilities show most promise, at present, for liquid cargoes; dry bulk goods may not prove economically amenable to offshore handling. With petroleum, for example, offshore island ports or unloading and transfer facilities might be constructed and combined with pipeline movements and secondary distribution by smaller ships and barges. Such operations are already in being in Europe and Japan; supercarrier facilities are under construction in eastern Canada; and have been mentioned for the Machias, Maine and Galveston, Texas areas, in addition to Delaware Bay.

Offshore facilities have, it appears, large potential for multiport or regional service capability. But this aspect, along with the question of safety, requires careful study. Additionally, it must be recognized that the location of regional-type service facilities could have a significant impact on subregional economies. Industries depending upon bulk raw materials such as crude oil or ore might migrate towards the supercarrier port. Clearly, therefore, any future study of transportation alternatives must be accomplished with due regard for their potential impact upon subregional and local economies.

The Corps has authority to conduct, in the San Francisco region, a precedent study aimed at developing answers to these questions. The San Francisco Bay In-Depth Study will be a coordinated comprehensive multi-agency investigation encompassing engineering, economic, social and environmental aspects of water-land transportation and port facility requirements. In response to a Congressional resolution, the study will include:

1. Consideration of possible range of commodity movements in the regional and international context.
2. Influence of technological change on fleet and handling facilities, including effect of intermodal problems on development.
3. Optimal pattern of commodity movements in terms of regional and national objectives.
4. Environmental factors, including fish and wildlife, recreation, and aesthetics as determinants of future development.
5. Coordination of governmental and private sector interests and programs as determinants of future development.
6. Relation of future port system to defense mobilization.

Conclusion

Technological advancement, measured in terms of greater size and efficiency of ocean vessels, has always been part of the maritime scene. But the changes now taking place in the shipping industry are more quantum than incremental in scope. A revolution in ocean shipping operations, affecting both equipment and cargo handling methods, is underway. There is great need for cooperative public-private action in the exploitation of new transportation technologies to avoid costly investment mistakes.

Mammoth tankers, capable of single-trip deliveries of over a million barrels of petroleum or petroleum products, are now in service and even larger vessels are under construction. Great unit cost savings are made possible by the supercarriers. But these ships require offshore mooring facilities or harbor and channel depths substantially greater than now available. Provision of such depths in many locations involves unprecedented physical, ecological, safety and financial difficulties or constraints. The provision of loading and unloading facilities for supertankers should be aligned with regional needs and marketing requirements. Studies and formulation of investment plans should be promptly initiated with close cooperation between the several concerned Federal departments and industrial, maritime and port associations. While the problem is complex, the opportunity for beneficial action is abundantly clear. □

THE NEED FOR RENEGOTIATION

On March 7, 1955, at a time when defense procurement was sharply reduced after Korea, President Eisenhower recommended the extension of the Renegotiation Act of 1951 and stated: "I make this recommendation because I believe the welfare of the country requires it." Eleven years later, at the peak of the Vietnam buildup, President Johnson commented on signing yet another extension of the act: "We need this vital measure. It is another important tool in our constant quest to get a dollar's worth of value for every defense dollar spent." Thus, in periods of both increase and decline in procurement renegotiation has been deemed necessary for the national welfare. By June 30, 1971, the present termination date of the act, it will have been in force for 20 years through nine extensions.

The purpose of renegotiation is the elimination of excessive profits on defense and space contracts and related subcontracts.

Legislative History

Although the present act was adopted in 1951, statutory renegotiation as an instrument of national policy goes back to 1942. Prior to that time Congress sought to prevent excessive profits on ship and aircraft procurement by enacting the Vinson-Trammel Act of 1934 and the Merchant Marine Act of 1936; these statutes limited profits to fixed percentages of the contract price. The Renegotiation Act of 1942 provided for the renegotiation of individual contracts and subcontracts. Within a short time, however, the Renegotiation Act of 1943 was enacted. This act established a fiscal year basis for the review of a contractor's total renegotiable business and prescribed specific factors to be considered in determining excessive profits. The 1943 act terminated on December 31, 1945. Subsequently Congress enacted the Renegotiation Act of 1948, which carried renegotiation to the effective date of the present act.

Defense-Space Market

The continuing need for renegotiation was stated by President Eisenhower in his already quoted message as follows:

> In spite of major improvements, which we have achieved in our contracting and price redetermination operations, there nevertheless remains an area in which only renegotiation can be effective to assure that the United States gets what it needs for defense at fair prices. * * *

The search for better ways to procure for defense and space needs has continued to the present time, and, indeed, significant improvements have been made. However, no conceivable improvement in the procurement process can alter two fundamental charactertics of that process: (1) the lack of a traditional market place to guide the pricing of most procurement, and (2) the fact that procurement is on a contract-by-contract basis.

There are significant differences between the defense-space market and the private competitive market. In the private market firms usually compete with each other in terms of quality and price and produce goods

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By **LAWRENCE E. HARTWIG**
Chairman, The Renegotiation Board

The Renegotiation Board—from left to right: William Henry Harrison; D. Eldred Rinehart; Chairman Lawrence E. Hartwig; William S. Whitehead; and Rex M. Mattingly.

with a known technology and cost. These conditions are not usually found in major segments of the defense-space market. Novel, costly and complex aircraft, missiles, space vehicles and other specialized items, which incorporate the latest advances in a rapidly changing technology, are purchased in that market. As Secretary Seamans said in the fall-1969 issue of this Journal (p. 3): "The desired characteristics of military systems frequently demand a quantum jump in the state of the art. In the commercial world this type of requirement is seldom laid upon large scale producers." Hence in the procurement of defense-space items, reliable production and cost experience is not usually available for accurately forecasting costs. Contract costs are therefore but estimates, that is, predictions of future events. Like all predictions, they are subject to change by later developments. Thus, in the procurement of major weapons or space systems cost estimates may be widely off target.

Excessive Profits Likely

The pervasive cost uncertainty that characterizes most of modern defense and space procurement, coupled with the fact that in many of these contracts huge sums are at stake, makes price competition often too risky for contractors or too costly for the Government.

But even in the procurement of products similar in type to those traded in commercial markets, where price competition would seem to be feasible, a reasonable profit outcome is not always assured. Notwithstanding this basic similarity such defense-space items are often specialized; the demand for them is often irregular and, in some cases, geographically concentrated. Under such circumstances, price competition may be limited and ineffective. Although this lack of adequate price competition is a possibility even under quite "normal" conditions, in time of war or national emergency, when there are sudden surges in the volume of procurement, this possibility is much greater. It is obvious, therefore, that contractors who are able to take Government contracts under these conditions may well make unusually high profits.

All in all, the conclusion follows that vast governmental expenditures are being made in the defense and space areas under circumstances where, regardless of the diligence of procurement officials, there is no guaranty against excessive profits.

The opportunity for contractors to realize excessive profits on Government business is further enhanced by the fact that all such business is awarded on a contract-by-contract basis.

This aspect of Government contracting cannot be emphasized enough because an individual price that has been carefully arrived at may nevertheless, as a result of unforeseen developments, produce excessive profits. As the 1956 report of the Joint Committee on Internal Revenue Taxation stated:

> If all prime contracts and subcontracts could be made at prices that were fair, not only in the light of the facts and circumstances then existing, but also in relation to all pertinent developments occurring later in the fiscal year of the contractor, principally additional production volume, and if all such present and future facts could be known by the procurement officer negotiating each individual prime contract, and by each industry purchasing agent negotiating each individual subcontract, there would be no need or justification for renegotiation at any time. Since this is not possible, it follows that an individual price that has been soundly negotiated and is honestly believed to be fair and proper at the time of the negotiation may prove, in relation to subsequent developments, to be unfair and improper in the sense that it yields excessive profits to the contractor. * * * (*Report of The Joint Committee on Internal Revenue Taxation Relating to Renegotiation*, 84th Cong., 2d Sess., Senate Document No. 126, p. 13.)

Procurement agencies price each contract separately and independently. On the other hand, renegotiation reviews the profit results of contracts after the fact on a fiscal year basis because the profitability of a contractor's participation in defense-space business can only be judged on the basis of his aggregate profit. This aggregate profit can only be evaluated retrospectively.

Renegotiation Only Reasonable Determinant

All the facts relating to a contractor's future operations cannot be known to procurement officers at the time a contract is let, no matter how sophisticated the personnel and procedures may be. Renegotiation therefore provides the only means to determine whether the profit of a contractor—or a subcontractor—is reasonable.

To the extent that the need for any activity can be measured by its results, the need for renegotiation is well attested by its achievements. Excessive profits determinations made by the Renegotiation Board from its inception amounted to $997 million as of June 30, 1969; by now this figure has gone well over $1 billion. These amounts are before Federal income tax credits; net recoveries by the Government as a result of the Board's determinations amounted to $394 million as of the end of the last fiscal year.

Although the purpose of renegotiation is not the raising of revenue, the recovery of $394 million is significant. Furthermore, the material benefits of renegotiation cannot be measured solely in terms of recovery. Voluntary refunds and voluntary price reductions made by the contractors also reflect, at least in part, the impact of renegotiation. These refunds and price reductions are voluntary, that is, they are not made pursuant to contract terms. Consequently, it is probable that in many instances they were made because of, among other reasons, a realization that, were they not made, the amounts involved would be recouped in renegotiation. From the inception of the act through June 30, 1969, contractors and subcontractors reported to the Board $1.3 billion of voluntary refunds and voluntary price reductions.

Deters Overpricing

Renegotiation also has an impact on procurement as a deterrent against overpricing. Over the years, procurement officials have repeatedly testified to the value of renegotiation in their endeavor to negotiate closer prices; realizing that excessive profits will have to be refunded, contractors are more likely to agree to reasonable prices. The Senate Committee on Finance also recognized this effect of renegotiation in its 1966 report, in which it recommended an extension of the act:

> * * * the renegotiation process has had a deterrent effect on overpricing on Government contracts because of the realization that renegotiation is backstopping the allowable profits. (S. Rept. No. 1295, 89th Cong., 2d Sess. 2 (1966).)

There is no way to estimate the savings that accrue to the Government as a result of this deterrent effect, but there is reason to believe that the amount is quite large.

Over and beyond these benefits to the Government and the taxpayers, renegotiation benefits the contractors as well, and not only because they, too, are taxpayers. The national economy as a whole is sufficiently competitive to guarantee, in the long run, fairness in the profits of a business enterprise selling in the private market; this is not necessarily true in the defense-space market. Because of the peculiar characteristics of that market, unintended and unanticipated profits cannot be avoided, and excessive profits realized by a contractor may give him an unfair advantage over his competitors. Renegotiation helps to protect these competitors against such occurrences.

Necessary Substitute for Competition

Our economic system is based on the idea of the objectivity of market forces in an environment in which competition is presumed to adjust prices and costs to yield a fair profit. To the extent that the defense-space procurement process introduces—quite unavoidably—non-competitive elements, it may endanger that system. Renegotiation in all its aspects—both as a deterrent against overpricing and as an instrument for recapturing excessive profits—tends to assure that the rewards of defense-space business are comparable to those that would be obtained by contractors in a price competitive market. Thus to the extent that renegotiation ensures that no one profits unduly from such business, it is a valuable tool. ☐

THE HUMAN FACTOR IN THE ECONOMICS OF NAVAL DEFENSE

By ADM. BERNARD A. CLAREY, USN
Vice Chief of Naval Operations

LAST JANUARY I told a Navy cost reduction conference that selection boards and promotion panels should give more weight to cost-consciousness attitudes. The Defense Management Journal invited me to restate that view in print. Gladly. Let me begin.

The Defense Department's greatest asset today is the man or woman who knows how to save a dollar for the Government. I believe that kind of person deserves a more material reward than the simple satisfaction of a job well done. By this I mean that civilian personnel ratings and military fitness reports ought to reflect cost-consciousness attitudes. The realization that prudent management can directly influence career advancement, promotion and pay is a mighty strong inducement to save the Government's money—and I can think of no time when that inducement is needed more than now. Here is why: Defense is caught in the tightest cost squeeze ever with defense appropriations (as a percent of GNP) decreasing at a time when the threat to the Nation is increasing.

The Tax Load Is Up

There is no question that Government expenditures have been expanding rapidly in recent years.

Each of us has personally felt the effect of Government growth. Those of us who have been around longer notice it more. A few figures will emphasize what I mean.

In 1929, the total tax load represented by Federal, State, and local taxes amounted to approximately 10 percent of the country's gross national product.

By 1940, after 10 years of Government programs to counter the great depression, taxes absorbed 20 percent of the GNP.

By 1960, the tax take had increased to 30 percent of our total output. Today 35 percent, over one-third of the Nation's output, goes into the coffers of the local, State, or Federal Government taxes.

As our Nation's economy has grown in improving the overall standard of living of our citizens, our Federal Government has assumed ever-widening responsibilities. Much of this Government expansion is the result of the desire of our people for security—economic security, as well as military.

In fiscal year 1962, after more than 180 years of Government, the Federal budget first crossed the $100 billion mark. In fiscal 1971, just 9 years later, a budget approaching $200 billion is expected.

Weapons Costs Are Also Sharply Up

Similarly, the cost of weapons procured for our security has accelerated at an almost explosive rate over recent years.

In August of 1943, I was assigned to fitting-out duty at the naval shipyard, Portsmouth, N.H., as PCO of the submarine USS *Pintado*, SS 387. That submarine had an original acquisition cost of about $4 million. On 16 August 1969, I participated in the launching ceremony of the nuclear submarine *Pintado* (SSN 672) at Mare Island. High speed nuclear attack submarines such as the new *Pintado* are now being funded at about $105 million. Costs of our latest planned new submarine will be around $160 million. They are vastly different from the original *Pintado*, of course, but so are all of the technical components of our Armed Forces.

"Admiral Moorer and I believe that cost consciousness ought to be a matter of record in civilian personnel ratings and miltiary fitness reports."

Another example is the aircraft carrier *Bon Homme Richard* (CVA31) which was purchased in April of 1944 at a cost of less than $64 million. On the other hand, the new nuclear carrier, CVAN 69, was funded this year by Congress at a construction cost of $510 million. Fully equipped with crew, ordnance, and planes, she will represent an outlay of about $1 billion.

Even with the fantastic increase in equipment costs, which has taken place in the last few years, it is significant to note that the cost of defense has actually accelerated at a slower rate than the overall cost of Government.

Civilian Program Costs Outpace Military

Dr. Arthur Burns, economic advisor to President Nixon, in a speech on 2 December 1969 stated that the skyrocketing increase in Federal spending was not caused principally by the defense establishment. He emphasized that civilian programs were the preponderant cause of the budget growth. To support this he gave several facts:

- The fiscal year 1971 budget will be about $74 billion higher than 1964, while defense outlays will be larger by $23 billion.
- Going back to 1953 and considering Federal, State, and local expenditures, defense has been responsible for one-sixth of the increase in the budget.
- The fiscal year 1971 programs for education, manpower, health, income security, housing, community development, and crime prevention will cost over $80 billion (which exceeds all Federal spending in the peak year of the Korean war). Aid to the poor in 1971 will be $27 billion versus $12 billion in 1964. Grants-in-aid States and municipalities will be $25 billion versus $15 billion in 1967, $10 billion in 1964, and $5 billion in 1958.

I have quoted Dr. Burns' speech to show you that while the military budget has been increasing insofar as dollar amounts are concerned, the percentage of appropriations spent on defense has been decreasing. In other words, a lower percentage of our GNP is allocated for national security. Yet the threat to the Nation has not been decreasing; it has been increasing.

Needed: More Defense Per Dollar

What does this mean to us? It means that we have to get more for our defense dollar than we have in the past. We must do this if we are to provide the security our country requires.

The pressure, both public and congressional, for reduced defense spending is quite apparent. It is clear that the military services are in the midst of a period of austerity.

If we are to maintain an effective defense posture in the decade ahead, we must each search for new and improved ways to do our assigned tasks—ways to accomplish normal functions with reduced expenditure. In this way, we can still provide funds to improve our fighting capability.

The ingredient most essential to this effort is high quality personnel. We need men and women with imagination and initiative—personnel who are unafraid to question the validity of established practices, who understand the problems ahead, and are ready to tackle their jobs with increased vigor.

Cost Consciousness a Promotion Factor

We must identify the leaders among our people, both military and civilian, early in their careers. We must then channel their superior abilities into productive lines. Cost consciousness is an attitude of mind. It should have a major and increasing impact upon each individual's career. Admiral Moorer and I believe that cost consciousness ought to be a matter of record in civilian personnel ratings and military fitness reports. This factor must be given more weight by selection boards and promotion panels.

Men with a penchant for accomplishing essential tasks as economically as possible can be identified. Once we have found them we must give them recognition and encouragement. They should be moved into positions of responsibility from which their quest for improvement may be expanded.

Secretary of the Navy John Chafee presents award for cost reduction program excellence to Brig. Gen. H. W. Hise, Commanding General, Marine Corps Air Station, El Toro (above) and to Vice Adm. W. I. Martin, Deputy Commander in Chief, U.S. Atlantic Fleet (below).

The Navy's cost reduction program reporting system affords an excellent opportunity for identifying such people. But, only actions which have made appropriated dollars available for better use are reportable under this system. The system, as presently structured, does not readily identify persons who have affected cost reduction measures in the process of developing a budget request. We must find a way to spot these people, too. Further, we need the incentives to keep them in our employ and to give them greater opportunities to demonstrate their cost consciousness and skill.

The Tools of Good Management

Ours is a never-ending search for ways and means to reduce the cost of maintenance and supply support of our fleet while improving the readiness posture of our ships, aircraft, and ground forces. The Navy Maintenance and Material Management System, commonly called the 3–M system, was one result of this search. In its 5 years of existence, the 3–M system has provided a powerful tool for effecting cost reductions throughout the Navy. Our computers at Mechanicsburg and in the fleet can, and have, turned out volumes of data on equipment failures, their causes and other factors incident to the maintenance of shipboard and aeronautical material. Men with vision are now using these data to significantly reduce costs. As 3–M becomes a "way of life" in the Navy, the potentials for cost reductions will be tremendously increased. We still need more men who have the ability and courage to effectively utilize 3–M data to improve or eliminate equipment. Men who can correlate 3–M and supply data so as to reduce inventories and investment.

Everyone should be challenged to apply the value engineering concept to his current work requirements:

- Determine the real purpose of the task.
- Decide if the task is truly essential to the mission and needs of the Navy or Marine Corps.
- Visualize other possible ways to accomplish the real purpose.
- Adopt the way which accomplishes that purpose most efficiently.

The person who accepts this challenge may initially spend a little more time getting his job done, but his effort soon will pay off. As his cost consciousness rating goes up, his ability to operate in this austere fiscal environment will improve. Added prestige, and ultimately, added responsibility will be his.

Recognize Talent and Dedication

What is good for the Navy and the U.S. Government is, in fact, good for the man who brings it about. Every supervisor should make this fact clear to every Navy man, military or civilian, under his supervision. When the dedication and pride in performance of the individual can thus be tied to the improvement of the service and the good of the whole Nation, we will have an incentive reinforcement that just can't be denied. We, critically—I might say, desperately—need the practical application of this logic translated into visible and quantifiable results.

I urge every Navy supervisor—military or civilian, male or female—to see that every person who contributes significantly to the Navy cost reduction program receives personal and appropriate recognition. This could take the form of a personal letter, or an appropriate entry in his official performance record. Even a personal word of encouragement. This little extra effort can spark additional ideas which will bring us through the austere years ahead. The Navy has a fine record in cost reduction. Continue to improve it by all possible efforts. □

Outlook for Value Engineering

THE TROUBLE WITH INNOVATION

By HUGH McCULLOUGH
Special Assistant to the Assistant Secretary of Defense (Installations and Logistics)

Last year our military medical people agreed that first aid in the field does not demand the kind of quality in a bandage scissors that the operating room in a general hospital does. So out of the field medical kit came the heavily weighted scissors of forged steel with mirror finish and mechanized catch and spring. Into the kit went a 90 percent lighter plastic-handled scissors without catch and spring. The price difference was $6.90 per kit. Last year that change saved the Department of Defense over $270,000.

In fiscal year 1969 the Department of Defense documented 3,500 innovations of this nature—innovations that saved the Government $342.2 million. This kind of innovation occurs every day, many times a day, to the advantage of the Government.

The trouble is that it is not happening often enough.

- In fiscal year 1969 this kind of technical improvement reached less than one-tenth of 1 percent of the items managed by the Department of Defense.
- In fiscal year 1969 only one out of every 10 major contractors whose contracts offered them opportunities for substantial gain from technical innovations actually capitalized to a significant extent on the opportunities.

What can be done to improve the percentages? The answer, of course, is to stimulate technical breakthroughs that reduce product costs. How well or how poorly that is done depends on three key participants in the procurement process. One is the weapons system manager. The second is the contractor who supplies the weapons system or material for it. The third is the "idea-evaluator" (the engineers, logisticians, and other decisionmakers who administer the process by which contractor-proposed innovations are approved).

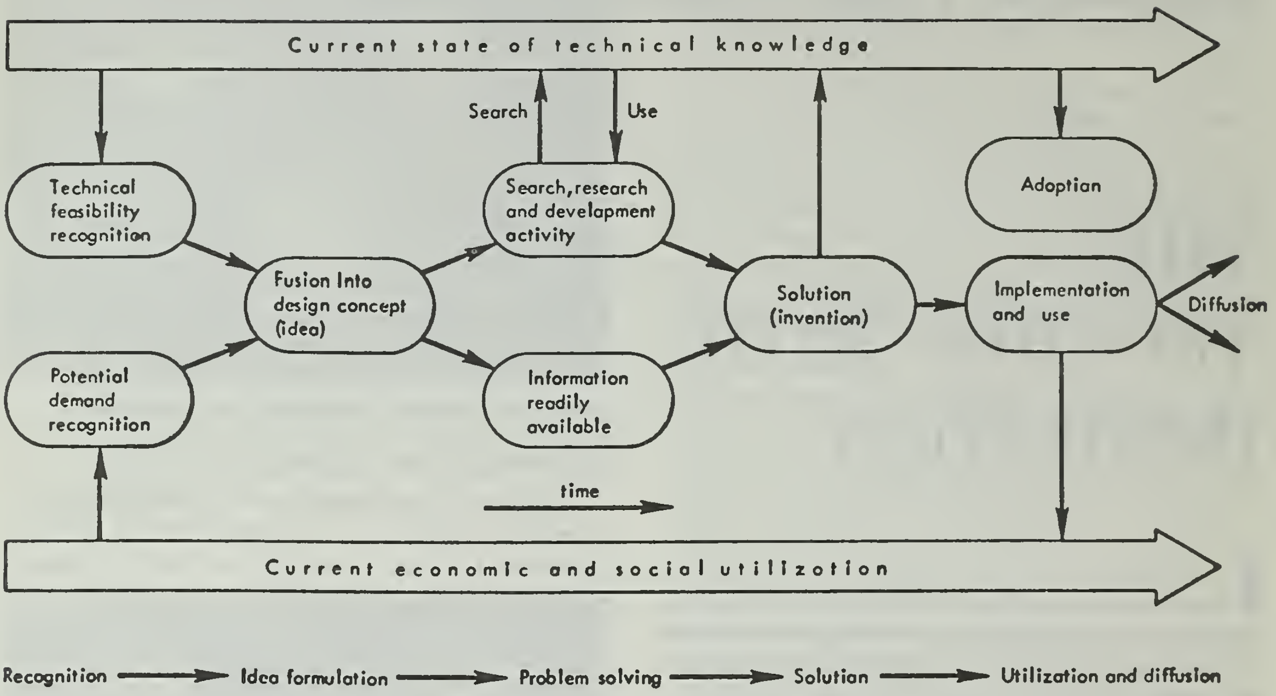
Weapons System Manager

Weapons systems management too often evidences a dismaying unconcern for searching out cost reduction opportunities. One reason may be that the weapons system manager sees himself as a man charged with bringing home the bacon. If he misses the schedule, everyone knows it. If he brings home second-rate stuff, sooner or later someone recognizes it. Chances are, however, no one will ever fault him for foregoing an opportunity to pay less than the going price for an item. After all, it is pretty hard to prove lost opportunities. Consequently, on a purely defensive basis, cost concerns over and above the normal routine can easily become secondary considerations for him. The problem is to get the weapons system manager to recognize that getting "the right products to the right place at the right time" is only half his job. The other half is to discharge those responsibilities "at least cost."

Admiral Clarey, Vice Chief of Naval Operations, in comments appearing in this same issue of the Defense Management Journal, may well have stated the best solution to this problem. He says, "Cost consciousness is an attitude of mind. It should have a major and increasing impact upon each individual's career. Admiral Moorer and I believe that cost consciousness ought to be a matter of record in civilian personnel ratings and military fitness reports. This factor must be given more weight by selection boards and promotion panels. Men with a penchant for accomplishing essential tasks as economically as possible can be identified. . . . They should be moved to positions of responsibility from which their quest for improvement may be expanded."

Another drag on the in-house administrator is the inhibition—unsupported by fact—that any savings he reaps is money lost to his program. Why should he save dollars that he can't call for in the future? The truth is that *all* dollars saved through innovative engineering return to the department reporting the savings to be used once again.

The process of technical innovation


Current state of technical knowledge
Search
Use
Technical feasibility recognition
Search, research and development activity
Adoption
Fusion Into design concept (idea)
Solution (invention)
Implementation and use
Diffusion
Potential demand recognition
Information readily available
time
Current economic and social utilization
Recognition → Idea formulation → Problem solving → Solution → Utilization and diffusion

Source of above figure: Successful Industrial Innovations—A Study of Factors Underlying Innovation in Selected Firms, National Science Foundation NSF 69–17.

The Contractor

Defense contractors would appear to have strong financial incentives for generating ideas that lower product cost to the Government. One kind of contract provision—value engineering—permits a contractor to share in savings that he produces for the Government—under both on-going contracts and future contracts; further, the contractor can share in savings that accrue collaterally to the Government from his ideas, e.g,, as in decreased logistical support costs. A second kind of contract arrangement not only furnishes government funds to pursue these "innovation-generation" programs but also enables contractors to share in the fruits of these Government-funded efforts.

Yet, despite these inviting terms, fewer than one third of the Defense Department's prime contractors whose contracts contained value engineering incentive clauses actually undertook to capitalize on these opportunities for increased profits during FY 1969. In fact, only slightly more than half of those who made the attempt actually succeeded in having their cost-saving proposals approved by the Government so that they could share. Moreover, a bare handful (eight contractors) of those who did succeed contributed more than two-thirds of the savings the Government realized last year under these clauses.

Why the low level of response and the lower level of success? There are several reasons.

First, there is the inclination of sales managers to look upon decreases in contract price as losses in sales volume—increased profit notwithstanding. So sales managers fail to sell the incentives program to their organizations. Top management could change that attitude by crediting the sales manager with the volume of nonincentive sales he would have had to generate to produce the same net profit for the company that the "incentive" sales returned.

Second, there is the normal reluctance of technically-oriented personnel (particularly designers) to accommodate themselves to a management technique that calls on them to direct soul-searching analyses at products they themselves have had a hand in creating. They are like authors who edit their own material—inclined to spare the blue pencil and spoil the copy. Value analysis is one function the detached outsider can perform better. An absence of any emotional ties to a product's components and construction could prove the best milieu for new insights. The "outsider," however, ought to be a craftsman at his trade. Too often, according to *Purchasing Magazine* (January 22d issue), value engineering is a "sinecure for tired engineers" who "couldn't make the grade." The *Purchasing* item concludes that "purchasing managers and engineering department heads must make sure that VE personnel are the cream of the crop if they want to get the most out of the program."

VECPS SAVE $84 MILLION IN FY 1969

The Defense Department accepted 1,221 contractor Value Engineering Change Proposals (VECPs) during FY 1969, reducing Defense contract costs more than $84 million. Through the value engineering clause in their contracts, the companies' shares of savings varied from 20 to 60 percent. The following companies had Hi-Dollar VECPs (net savings of at least $50,000 before value engineering sharing) accepted during FY 1969:

Aerojet General Corp.; Aircraft Armaments, Inc.; American Electric and Machine Co., Inc.; Apex Metal Stamping Co., Inc.; API Instruments Co.; ARF Products, Inc.; Aseco, Inc.; AVCO Corp.; Bell and Howell Co., Inc.; Bendix Corp.; The Boeing Co., Inc.; Bowen-McLaughlin-York, Inc.; Bulova Watch Co., Inc.; Burroughs Corp.

Caterpillar Tractor Co., Inc.; Chamberlain Corp.; Condec Corp.; Continental Aviation and Engineering Corp.; Crowell Constructors, Inc.; Cullman Metalcraft; Daily Tube and Form Co., Inc.; Day and Zimmerman, Inc.; Eastern Tool and Manufacturing Co.; EG&G, Inc.; Fairchild Hiller Corp.; Fruin-Colmon Contracting Co.

Galion Amco, Inc.; Garrett Corp.; F. W. Gartner Co.; General Dynamics Corp.; General Electric Co.; G. G. Green Inc.; Goodyear Aerospace Co., Inc.; Grumman Aircraft Engineering Corp.; Hayes International Corp.; Hercules, Inc.; Hochtief AG; Honeywell, Inc.; Hughes Aircraft Co.; Kaiser Jeep Corp.; Kennedy Van Saun Manufacturing and Engineering Corp.

Lasko Metal Products; Litton Industries Inc.; Lockheed Aircraft Corp.; LTV, Inc.; Magnavox Co.; Martec, Inc.; Martin-Marietta Corp.; Melpar, Inc; North American Rockwell Corp.; Northrop Corp.; Ocean Products, Inc.; Olin Mathieson Chemical Co.; Philco-Ford Corp.; Raytheon Co.; RCA Corp.; R.C. Can Co.; REDM Corp.; Reflectone, Inc.; Rubber Fabricators, Inc.

Sanders Associates, Inc.; Sargeant-Fletcher Co.; Sperry Rand Corp.; Tacoma Boatbuilding Co., Inc.; Textron, Inc.; Thompson Aircraft Tire Corp.; TRW Systems; United Aircraft Corp.; Westinghouse Electric Corp.; Wythe Tool and Machine, Inc.; Yankee Hill Machine Co.; Zenith Radio Corp.

Third, there is the feeling on the part of some companies' administrators that value engineering "incentive" clauses tend to take the edge off more valuable incentives in a contract. Also, they may feel that processing a proposal through the bureaucracy causes too much extra work.

The basic problem here is to educate the administrator out of his prejudices—to overcome his ingrained attitudes and to convince him that value engineering incentives are not only *not* pie-in-the-sky but even offer rewards that are stronger and more immediate than other incentives—and in no way conflict with the latter.

Fourth, and finally, there is the apathy—or lack of understanding—of top management. Many key executives in companies doing business with Defense still are unaware of the tremendous profit potential value engineering programs offer. One director of contracts for the Government (who has some 2,300 firms under his watchful eye) states that many company executives tell him their business income accrues from three sources: about one-third from new contracts; about one-third from additional work assigned under existing contracts; and about one-third from changes to existing contracts. Granted that these proportions do vary with different companies, the point is that this formula does not itself credit innovations under existing contracts as a source of income. Yet, five companies in the last 3 years earned themselves $30 million (over and above contract price) by saving Defense $75 million through 160 innovative product improvements.

Could it be that the nonparticipating companies are looking for the long ball (a Fleming for penicillin, or Goodyear for vulcanized rubber) rather than the surer, more immediate payoff of the base hit? If so, it may still take considerably more indoctrination for many top executives to realize that small incremental gains from value engineering strike the most profitable medium between the brand new once-a-lifetime pathfinding discoveries of R. & D. and the inertia of doing business the same old way at the same old stand.

The Interdependence of Cost Reduction and Value Engineering

What appears to be needed most is a reversal in attitude. Lip-service to cost reduction, innovation and product improvement will not turn the trick. Budgets, organization, staff, and training will. The Building Research Advisory Board of the Federal Construction Council, in a May 1969 report, said that "top management support is needed initially for the training of engineers in value engineering principles and techniques." Further, said the Board, top management support seems to depend on the ability of the value engineeding program to demonstrate savings. The Board states that savings can be demonstrated "by tying the value engineering program to a cost-reduction program in which claimed savings are validated in accordance with established accounting rules."

The parallel development of the DoD's value engineering program and cost reduction program during the early Sixties bears out their reliance on each other. The first Defense instruction covering the cost reduction program gave value engineering its first dollar goals, its first ground rules for quantifying progress, and its first system for reporting achievements. Also, the defense cost reduction program helped build recognition for value engineers (e.g., by honoring outstanding value engineering achievements at annual Washington-based awards ceremonies in which the President or Vice President have participated, and at which the value engineering discipline has walked off with 30 percent of the honors).

The cost reduction program has also enhanced the interchange of value engineering ideas, techniques and philosophies, through such media as: (1) The DoD Handbook entitled "Ideas for Managers"; (2) the Defense Management Journal, a professional logistics quarterly; (3) brochures of cost reduction examples (published annually); (4) several other publications (including the Manufacturing-Cost Control Digest published by the Defense Contract Administration Services Regions); (5) exhibits (such as those positioned on the Pentagon concourse each year); (6) motivational films (e.g., the OSD film series entitled "So What's New—In Ideas?"); and (7) symposiums (like the cost-reduction workshops conducted this past year by Army, Navy, and Air Force).

This relationship between the value engineering and cost reduction programs is not a one-way street. Value engineering has substantially benefited the Defense cost reduction program. Last year value engineering accounted for 22.6 percent of the $1.54 billion savings reported in the cost reduction program—quite a sizable proportion of the whole when you consider that value engineering is only one of 19 sources of savings in the cost reduction program. It is my impression that the substantial interplay of value engineering and cost reduction during the Sixties benefited each. For the future, I look to both of these disciplines—cost reduction and value engineering—to serve the cause of innovation as successfully as they have served each other, and I expect they can best achieve that objective as the coordinated interdependent programs that they are.

The Economic Motivation

Some years ago a professor of business administration at the University of Hawaii, writing for the Defense Management Journal, said that "to innovate" means "to maintain position over time." He meant, of course, that technology is moving so fast today that you have to run harder just to stand still. In my book, he is right. ☐

When I report to you next year on the status of our logistics management, I expect the record to show that we have continued to employ vigorously the management improvement disciplines of the Cost Reduction Program and the new Logistics Performance Measurement and Evaluation System. I am convinced that by applying strong pressures in the right places through specific goals, audited measurements, penetrating analyses and firm, timely decisions, we can continue to raise the quality of our management. We are looking for performance that gives the taxpayer top value for his dollar while guaranteeing our combat troops the best support possible.

Sec/Def Memorandum for the President dated 17 October 1969: signed—Melvin R. Laird.

A Quick Insight for the Uninitiated Into— PROGRAM PLANNING AND BUDGETING THEORY

By **WILLARD FAZAR**
U.S. Bureau of the Budget

What Is PPBS?

PPBS is many things for modernizing management and decisionmaking at all levels. It is a mechanism for making hard choices; a means for deciding among competing claims for always limited resources; a system for establishing priorities, setting policies, and for describing numerically, difficult problems and the impact of alternate decisions for their solution.

PPBS is an integrated system to improve the information base for policy, program and resource-allocation decisions. It is a unifying and comparing process for higher level review and analysis of program alternatives. It provides, through narrative and numerical expression, an explicit determination of the relative efficiency and economy of allocating limited resources to alternate plans for achieving concrete objectives. It is a means for revealing the long-range consequences (in terms of estimated costs and benefits) of annual or short-range decisions and actions on plans, programs, and resource allocations. It provides the basis for effective evaluation and integrated control of ongoing programs.

The Background

PPBS was originated by the Department of Defense to cover all of the activities and resource applications of all the armed services. By 1964, this system had proven its capacity to provide the Secretary of Defense with the explicit information required to formulate his judgment before making big and crucial decisions for the allocation of resources approximating half of the federal

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Excerpted from Special Libraries, 60: (No. 7) 423–33 (Sept. 1969).

budget. His decisions could then be substantiated by the PPB systems information documented before his decision-making.

In August 1965, the President directed his Cabinet and agency heads to adopt PPBS in the civil sector of the federal government, based on guidance from the U.S. Bureau of the Budget.

Soon thereafter the Bureau of the Budget issued a bulletin containing instructions for implementation of the system. This bulletin along with subsequent modifications continues to require the following materials from major Federal agencies in the executive branch:

1. *A Program Structure* that classifies all of an agency's activities, hierarchically, into program categories, subcategories, and elements.
2. *Program Memoranda (PM)*. The PM is a document, oriented toward major program issues, that presents for all or part of a program category a comparison of the cost and effectiveness of alternatives for resolving those issues, the agency head's recommendation on programs to be carried out, and the reasons for those decisions.
3. *Special Analytical Studies (SAS)*. The SAS provide the analytical ground work supporting the budget request decisions reflected in the PM's for both the budget year and for subsequent years.
4. *Program and Financial Plans (PFP)*. A multiyear summary tabulation of agency programs in terms of their outputs, costs, and funding requirements for the budget year and at least 4 subsequent years.

Since 1965 interest in and adoption of PPBS has spread well beyond the Federal Government:

> U.S. States, counties, cities, and localities are studying and developing its application for programs under their jurisdictions, for example, New York. California, Michigan, many counties, Detroit, Denver, New Haven, and Pittsburgh.
>
> Nations around the world are developing its application for more effective government management and to accelerate national development under the limited resources available, for example, Canada, Chile, Sweden, Israel, Belgium, and many others.
>
> In the fall of 1965, the UN General Assembly endorsed the adoption of Program Budgeting by individual UN agencies, based on assistance provided the Expert Committee of 14 by the U.S. Bureau of the Budget.
>
> Some universities are undertaking its application for improved institution-wide management and decisionmaking.
>
> Even some industrial firms are exploring its utility, especially in the field of utilities.

The Methods

Once the program structure is established and concrete objectives are identified, the merit of decisions for action and for the allocation of resources hinges on the extent and validity of an organization's analytical effort. This effort involves the systems analysis, operations research, and application of pertinent economic, statistical, and mathematical techniques appropriate for diagnosing interrelationships of variables and for quantifying estimates of costs, effectiveness, performance, uncertainty, etc. Continuous analytical effort must be applied throughout the PPBS activity to support decisionmaking and changes that may become necessary at any point in time. The budget that results is the financial expression of the program plans.

Systems analysis is the key to PPBS pay-offs, including the derivation of the successive approximations of the cost-effectiveness of program plans to achieve specified results. Systems analysis is an orderly method for evaluating all of the major factors bearing on the achievement of specific ends by alternate means. Systems analysis is the mechanism for treating the total problem under consideration instead of only parts and pieces of the problem—a practice too often employed with the excuse that parts of a problem are easier to understand and handle. Systems analysis has five principal elements which, in effect, constitute the ingredients of PPBS analysis:

1. *Objectives.* The objectives of program plans must be identified concretely. To say that the objective is to "improve" something or to perform "better" may sound nice, but it is soft and intangible instead of concrete. Every program plan should have an objective or objectives, including time phased benchmarks to achieve them, that are worded or identified so that whenever the question is asked, "Has it been done?", the answer must be "Yes" or "No." The answer must not be "We're doing it" or "We're always doing it."
2. *Alternatives.* The choices for decision are represented by the specification and comparative analysis of alternatives. The need to identify and analyze alternatives stems from recognition that the decisionmaker is entitled to a better basis for his formulation of judgement—something more than the usual approach that presents him with a single program plan requiring "X" amount of resources along with the implication "It's the best. Take it or leave it." Systems analysis should be applied to several *feasible* alternatives, including alternative courses of action to achieve a given objective, but not excluding courses of action to achieve alternate objectives.
3. *Costs/Resources.* Explicit estimates of the resources required to carry out the several alternate program plans are essential for the diagnosis. The estimates must be made not only for the budget year but for all of the subsequent years through the time of completion of the objectives. The estimates should cover both dollar costs and the physical resources to be procured for those dollars, e.g., manpower, facilities, materials, etc.
4. *Models.* A model is often helpful to illustrate and simulate a complex problem and the means for solution, without going through the actual experience and investment of resources. A wide variety of models can be useful for this purpose. They range from a simple drawing, such as a road map or flow chart, to complicated

mathematical models. The numerical depiction of the mathematical model, e.g., a linear programing model, can be especially helpful as one form of quantification in PPB systems analysis.

5. *Criteria.* "Criteria" can be defined, simply, as "tests of preference." Sound criteria must be developed and stated explicitly as the bases for assessing the effectiveness, benefits, or utility of achieving the objectives of program plans. Since a principal purpose of PPBS is to estimate the cost-effectiveness or cost-benefits of alternate program decisions, the development of an effectiveness or benefit scale should be based on the numerical expression of criteria satisfaction (often called "performance" at different cost levels. This is illustrated, without entry numbers, in figures 4 and 5. Unlike business and industry where a single criterion (profit) can usually be used to measure effectiveness, the effectiveness of most governmental, academic, and library activities and programs depends on more complex and less tangible criteria.

The methods used for PPBS analysis may be described through a variety of closely intertwined and overlapping terms, including systems analysis, applied economics, operations research, management science, econometrics, quantitative reasoning, statistical methods, input-output analysis, and more. All of these terms involve the use of scientific method, numerical expression, logic, rigor, and explicitness. A large number of analytical procedures and specific techniques are available to conduct the systems analysis. Together, they comprise a huge workshop of tools or techniques. They present the skilled analyst with the problem of knowing what is in the workshop inventory, and of choosing the right tool(s) for the job to be done. Care must be taken to avoid the application of a very fine tool or technique to the wrong job or problem.

Let us take a quick-brush tour through the workshop to look at some of the tools or techniques available and at some types of products useful for the decisionmaker who may never go through the workshop and who is not skilled in applying the tools.

Many of the tools or techniques for PPBS analysis can be grouped under applied economics and quantitative reasoning.

Applied Economics

Economics is sometimes described as the science of how we choose to make the best use of scarce or limited resources, physical and dollar resources, to produce the goods and services required for mankind. Since the overall mission of the Federal Government is to serve the American people by employing its limited resources to provide the goods and services they require for effective government, some of the economic principles, concepts, and laws are particularly relevant to the development and operation of PPBS.

The notations and illustrations that follow are grossly

SOME GUIDING PRINCIPLES

1. *Don't fight it, try it!* The negative approach is used by those who spend time and energy finding reasons why it cannot or should not be done. This is "fighting the problem" instead of "solving the problem."

2. The *program structure* should be developed without regard to organizational structure. Many programs cut across the organizational structure, making it foolhardy to assume that major organizational segments are synonymous with major program categories.

3. *"Better be roughly right than exactly wrong"* are the words of Mr. Systems Analysis *(8, 9)*. Precise answers can be derived from fine and fancy quantification techniques, but "there is great danger in this business to get mesmerized by the techniques" and end up with the perfect answer to the wrong problem.

4. The development and continuous operation of PPBS requires the approach of *"successive approximations,* beginning with a first rough cut and followed by a series of refinements that will never be perfect, precise, or optimal." *(8, 9)* This principle merits close to first place in our thinking because it fosters getting started, no matter how rough and inaccurate the original estimates may be. Once drafted, they do provide the basis for successive refinements and improvements.

5. The question to be answered by PPBS is "*What is right?*" not "Who is right?" The decision-maker should have the answer to the former question even if his decision favors the answer to the latter question. That is his responsibility.

6. Systems analysis must be conducted with *continuity*. The findings from one-time analysis should not be set in concrete, thereby failing to keep abreast of changes and refinements that should modify the one-time analysis.

7. Cover the *total problem* by avoiding the omission of significant components of factors or ad hoc consideration of only parts of the problem. Similarly, exclude factors that are irrelevant.

8. Identify explicitly the *assumptions* made and the *uncertainties* in store.

9. If initial results disagree greatly with the decision-maker's intuition, *back to the drawing board!*

10. KEEP IT SIMPLE! " . . . the techniques we use are, generally speaking, the simplest." *(8, 9)*

simplified in order to provide just a little exposure to the subject for those who are not well acquainted with applied economics techniques.

Applied economics for optimizing choices can proceed in two ways: through *economy,* to achieve a given result or output for least resources; or through *efficiency,* to get the greatest benefit or output for a fixed amount of resources.

1. *The law of diminishing returns* concludes that, generally, increases in some inputs or resources relative to other fixed inputs or resources will increase the total output less than proportionately to the increase in inputs, so that additional output derived from a given addition of input diminishes. This law is basic to answer a vital PPBS question: "Will the increment of funds requested for this program, provide an increment of output commensurate with the cost?"

2. *Marginal reasoning,* which requires incremental analysis , is a PPBS requisite to determine and compare the worth of additional increments of inputs for the achievement of a fixed output and of alternative outputs or program objectives. Sound incremental analysis involves comparisons of increments of cost with increments of benefit to estimate and display the significance and interrelationship of increments of cost and of output such as, utility, product, returns, or benefits. Where the net increment of a move is positive, it is likely that a further move in that direction will yield a further net benefit. When an optimum has been reached, no incremental move, either up or down, will yield any improvement. This position is sought through marginal reasoning.

Utility is the capacity of a good, a product, a service, or an output to satisfy a human want. The economic law of diminishing *marginal utility* is applicable here since additional units of a given good most usually give less satisfaction or utility than units previously available. By comparing utility in our minds, we can construct a hypothetical scale with numerical values to demonstrate the relative utility of different quantities of a good. Since the validity of numbers representing the satisfaction derived may be highly questionable, effort should be exerted to develop numbers that approximate relative utility in the decisionmaker's mind.

3. *The marginal product* is the extra output derived by adding an additional unit of a given productive factor with no change in the input of other productive factors. Here again, the extra units of the one factor may increase total output with diminishing marginal returns or output to the point where an additional unit of the given factor will not yield sufficient output to pay for the input cost, and if units of the factor continued to be added, the marginal unit added will yield no additional returns or product for the resources invested. Marginal product measurements can be quantified more reliably and objectively than those for marginal utility.

TABLE 1.—*Decision table for costs with diminishing returns*

Units produced	Fixed cost (cents)	Total cost (cents)	Total variable cost (cents)	Average variable cost (cents)	Average fixed cost (cents)	Average cost (cents)	Marginal cost (cents)
1	30	40	10	10.0	30.0	40.0	10
2	30	49	19	9.5	15.0	24.5	9
3	30	57	27	9.0	10.0	19.0	8
4	30	66	36	9.0	7.5	16.5	9
5	30	76	[1]46	9.2	6.0	15.2	[1]10
6	30	87	57	9.5	5.0	14.5	11
7	30	99	69	9.8	4.3	14.2	12
8	30	112	82	10.3	3.7	14.0	13
9	30	126	96	10.7	3.4	14.0	14
10	30	141	111	11.1	3.0	14.1	15
11	30	157	127	11.5	2.9	14.3	16
12	30	174	144	12.0	2.5	14.5	17

[1] The point where diminishing returns set in as variable costs for additional units move upward.

4. *Marginal costs* may furnish useful information not previously available for the decisionmaker. Practices employed to provide decisionmakers with cost information for different levels of output or number of products are ordinarily confined to figures representing total costs and average costs. But the important distinction between average costs and marginal costs is not always revealed. It is unfortunate that many managers take such pride in reducing the average cost per unit of output that, if they do not know the marginal costs of incremental units of output leading to lower average costs, they may incur marignal costs that cancel the benefits of further reductions in average costs, e.g., diminishing returns. Table 1 represents an end-product for the decisionmaker that exemplifies this situation.

5. *Production analysis* provides knowledge about the relationship between physical inputs and physical outputs, or the transformation of input into outputs, e.g., costs into products. The economic theory of production and marginal products is most relevant to this type of analysis. Because the efficient allocation of limited resources is a prime objective of PPBS, the economic choice of the decisionmakers should be formulated with

more explicit knowledge about the available alternatives, about what different combinations of things he can buy for those resources, and about the utility or worth of the outputs that might be derived or produced through various allocations of the inputs or resources. Some simplified illustrations of production analysis follow.

The production-possibility curve is useful to depict all possible maximum combinations of products that can be bought for a given input of dollars. The product combinations can range from apples *vs.* oranges, hospitals *vs.* schools, health *vs.* education, target destruction potential *vs.* defense kill potential, through "guns *vs.* butter." You can substitute any of these combinations for product X and product Y in figure 1.

The solid curve shows the estimated quantities of two products that could be bought for a given number of dollars. The dashed curve shows the quantities that could be produced for a given larger number of dollars. To estimate the combination of three or more products that a given number of dollars would buy, this approach is also feasible but admittedly more difficult. With this information no matter if only crudely approximated, the decisionmakers can tell that all of the points on the curve represent an efficient use of the given resources; that he has many choices; and that a choice of any point, such as point P, under the curve is *feasible* but would represent an inefficient use of the given level of resources. But which of the infinite number of efficient points on the curve should be chosen?

6. *Indifference curves* provide a means for closing in on that efficient point that maximizes the utility of a particular combination of the two products. Indifference curves reflect preference for different combinations of useful products that could be bought for different amounts of resources. The curve depicts equal satisfaction for different combinations, such as more of Y and less of X, equal amounts of Y and X, and more of X and less of Y. Personal preference or judgment is a factor that is recognized as a vital part of PPBS, for which quantification and the application of complex techniques are no substitute. The indifference curve, representing personal taste and preference, can be most helpful as a basis for the decisionmaker to make his choice. Several indifference curves to show combinations preferred for different levels of resources form an indifference map (figure 2).

In this indifference map, each curve convex to the point of origin (the dashed lines) represents the preference for combinations of "products" buyable for different levels of resources. The higher curves signify combinations preferred over those of the lower curves, e.g., more of both products instead of less of both products. By entering the production-possibility curve to show the possible combinations obtainable for a given level of dollars, the concave $B curve (the solid line), we note that the optimal point of choice, point P, is the point of tangency between the $B curve and the indifference curve as shown.

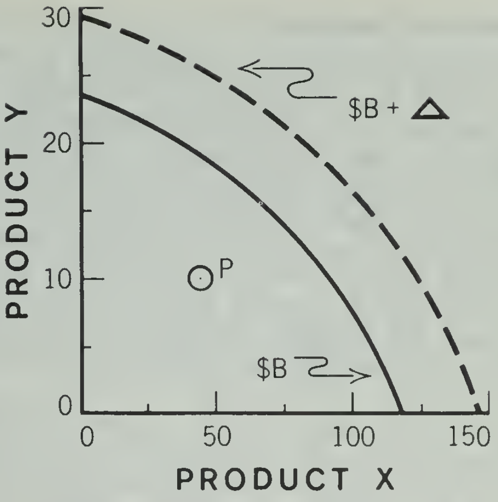

Figure 1. Production—Possibility Curve.

Admittedly, this illustrative example greatly oversimplifies the problem of locating the optimal point by systematic quantitative analysis. However, even though effort to find the exact location of this point may appear to be futile, any narrowing of the range of possible locations, as a result of such an effort, can raise the quality of the decisionmaker's judgment. As illustrated in figure 3, and as stated by Hitch and McKean (*4*):

> ". . . the best practical aim of systematic quantitative analysis is to demonstrate that some course of action A is better than some alternative course of action B, when B is what is proposed, or planned, or will otherwise occur. If B is an inefficient point, systematic quantitative analysis can find several efficient points A, A′, A″, . . . which can be shown to be superior to B. . . ."

The application of these tools of applied economics is described in more detail in the study by Hitch and McKean.

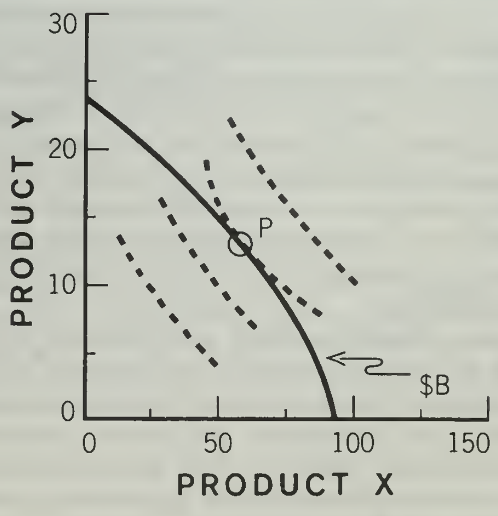

Figure 2. An Indifference Map.

Quantitative Reasoning

The translation of ideas and facts about a problem into symbols, diagrams and graphs, and numbers that represent them, involves the use of quantitative reasoning. By this means, it is possible to reduce such ideas and facts into manageable proportions, to measure or estimate their magnitude, to learn more about their interrelationships, and to answer significant questions bearing on how the problem might be resolved. Quantitative reasoning is naturally involved in the applied economics just described. But some additional quantitative approaches useful for application to PPBS problems, merit brief reference here:

1. *Operations research* (*OR*) is a principal means for quantifying complex problems and their possible solutions. OR applies a team of persons having relevant skill for the rigorous analysis and treatment of interdisciplinary problems. Many techniques are applied and innovated by OR teams to search for "optimum" solutions to problems. These include linear programing, queuing theory, gaming, mathematical modelling, and PERT.

2. *Statistical methods.* Statistics is a discipline that deals with tools for characterizing aggregates of figures. Statistical methods provide means for managing, understanding, analyzing, and manipulating masses of numbers by estimating or summarizing their central tendency, their dispersion, range and variance, their trends and significance and their probabilistic implications. The application of statistical methods to PPBS problems provides a more comfortable and rational basis for decisionmaking and for overcoming decisions that may be based on erroneous, intuitive, or impulsive evaluation and judgment.

To evaluate the risk and uncertainty inherent in all planning, programing, and budgeting, estimates can be obtained through the application of statistical methods, especially those available to measure and estimate the *probability* of outcome. A variety of statistical methods or tools are available to estimate or predict the likelihood of achieving an uncertain PPBS benchmark.

Statistical *sampling* is a means for estimating the scope, content, and characteristics of a large universe of numerical information on a given subject, e.g., population, retail prices for bread, labor earnings, etc. It is a means for saving time and money to obtain data representing information that would be too massive to cope with in totality.

Some statistical methods and techniques are particularly useful for *evaluation and control* of program performance. Regression analysis provides a capacity to predict future performance and determine what deviations from the satisfactory level are permissible and what deviations indicate a loss of control and need for remedial action.

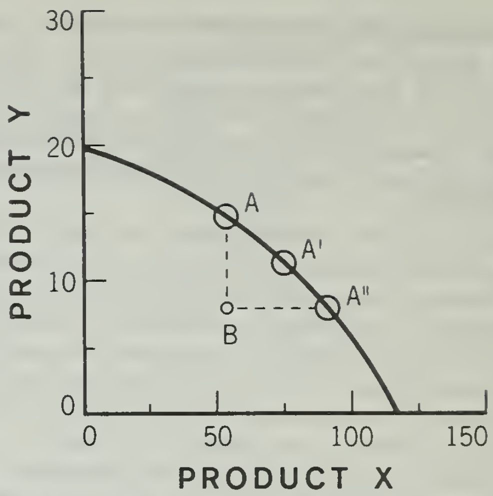

Figure 3. Inefficient Point & More Efficient Points

PERT (Program Evaluation and Review Technique) is, in effect, a statistical technique for management planning, programing, and control of the time, resources, and technology for achieving program objectives. PERT is a probabilistic technique that may be applied to estimate continuously the probability of program completion by any point in time.

3. *Mathematical techniques* include a wide range of tools for quantifying different aspects of PPBS analysis. Since mathematics is often called the science of quantity or quantities, the PPBS analyst must take advantage of this science as a help for resolving many PPBS problems. As a means for symbolizing, relating, and manipulating the variables bearing on program performance and evaluation, the laws and techniques of mathematics constitute a valuable resource for analysis. The building of a mathematical model of the problem is often useful to exemplify the problem and the impact of alternative solutions or decisions before any action is taken.

The diagraming of the results of cost-effectiveness analysis can be most helpful for decisionmakers to visualize easily the potential impact of choices for decision. Moreover, a few summary numbers that approximate and compare the "cost-benefit ratios" that can be expected from alternative courses of action can go far to simplify the worth of those alternatives in the decisionmaker's mind.

Simplified diagrams (figures 4 and 5) illustrate the kinds of end products useful to the decisionmaker, that can be obtained from cost-effectiveness analysis. Figure 4 shows the effectiveness or output that may be bought through one program plan for different costs or inputs. It demonstrates at point A that very little effectiveness can be obtained for very little cost; that very great effectiveness at point C can be obtained for very high costs; and very good effectiveness at point B can be obtained for much lower costs than the slightly higher effectiveness at point C.

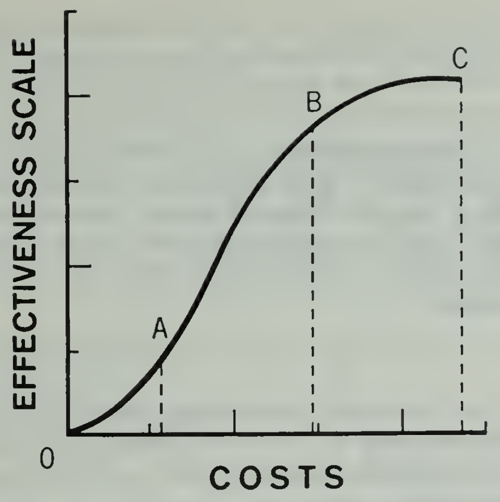

Figure 4. Effectiveness of One Program Plan for Different Costs.

In most cases for which a cost-effectiveness curve can be drawn, the choice for decision should center in the knee of the curve.

A comparison of cost-effectiveness for alternative program plans is shown in figure 5. In this case, curve A is the dominant alternative for choice. It is relatively easy to illustrate the results that are desired from cost-effectiveness analysis, but the production of reliable results includes some difficult tasks related to the development of appropriate and reasonable cost estimates as well as to the determination and scaling of effectiveness.

4. *Quality Analysis.* The quality of goods and services that constitute program outputs is an attribute that may be of primary significance for determining the costs or resource inputs for many programs. Quality analysis, therefore, must be recognized as an inherent factor in PPBS analysis. The PPBS emphasis on numbers and quantification does include the quantification of quality to the extent feasible.

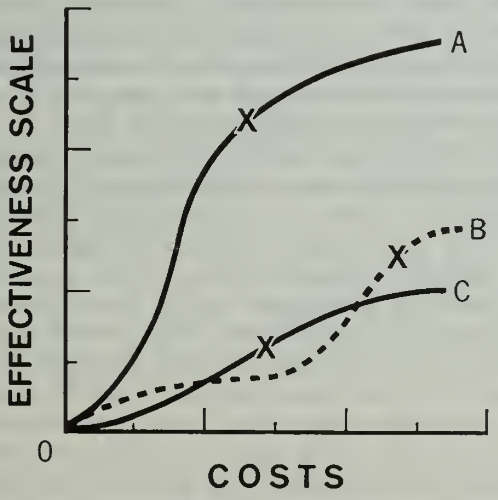

Figure 5. Cost-Effectiveness for Alternative Program Plans.

Since quality is a characteristic that may be either material and tangible or immaterial and intangible, any conclusion that quality cannot be described or measured by numbers would be incorrect in many instances. For cases in which quality is a physical attribute, e.g., the decibels of sound put out by a warning system, the tonal quality of a radio, the length of performance for a space vehicle battery, the reliability of a bulldozer, etc., it can be estimated or measured through quantification.

Whenever quality forms a significant influence on effectiveness of output and a difference in resources may result in a significant change in quality, the effectiveness scale used for cost-effectiveness analysis should include the quality factor.

Instead of concluding—even for those cases where quality depends on individual personal tastes—that "quality cannot be quantified," the door should be left open by raising the question, "How might we quantify the quality of output in this case?" □

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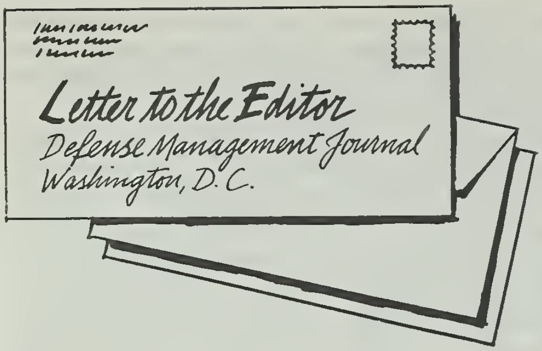


The Defense Management Journal asked Brig. Gen. George P. Holm to tell us how the 8th Field Army Support Command sharply reduced deadline rates for equipment while saving the Army $4.7 million in fiscal year 1969. His answer follows.

Sir:

When I arrived in Korea in June 1968, vehicle components and parts which were not in stock within a direct support maintenance unit's technical supply were removed from unserviceable, uneconomically repairable vehicles *only* when the parts were required to remove a vehicle from deadline. The "stripped" vehicle was then sent to property disposal. As a result, many serviceable and recoverable repair parts and assemblies on those unserviceable uneconomically repairable vehicles were lost to the supply system.

Consequently, we undertook to find out whether a command-wide program of controlled reclamation could economically reduce the vehicle maintenance backlog and return needed repair parts to Government service. Our findings showed that a centralized Collection, Classification, and Recovery (CC&R) activity could improve our materiel readiness. So we set one up.

The centralized CC&R activity opened for business on 19 August 1968 at the 335th Maintenance Battalion, southwest of Seoul. We listed 508 repair parts, assemblies, and components for recovery by the CC&R facility. This list was developed by carefully studying costs, need for the item, and parts availability in the supply system. The list is updated monthly and is circulated to all direct and general support maintenance units and to the repair parts companies. Stock control records in these units which pertain to the repair parts available at the CC&R operation are identified. Units are prohibited from requisitioning any items that are on the locally prepared recovery list (AR 700–1) from the wholesale supply system, thereby minimizing the expenditure of precious O&MA funds.

In Korea, a vehicle in need of repair is evacuated to a direct support unit where it is given a complete technical inspection. At this point it is determined to be either economically or uneconomically repairable. Vehicles designated economically repairable are routed to maintenance shops where the vehicle is repaired and returned to the supported unit. On return to the unit the vehicle continues in its combat support mission.

Unserviceable uneconomically repairable vehicles, if so ordered by the NICP under provisions of AR 755–1, are evacuated to the CC&R activity where they are completely disassembled and the serviceable component parts are reclaimed. Working in two-man teams, technicians from the CC&R facility disassemble these vehicles.

Assemblies such as engines, differentials, and transmissions are transported to an adjacent 8th FASCOM general support-maintenance company where they are steam cleaned, tested, and inspected for serviceability. Serviceable assemblies are painted, preserved, boxed, and sent to an 8th FASCOM repair parts company for re-entry into the U.S. Army supply system. Items requiring repair or reconditioning are processed at an 8th FASCOM general support maintenance unit. Many unserviceable items are repaired, to a large extent, using repair parts salvaged from other similarly unserviceable items. Once the assemblies are placed in a serviceable condition, they are processed in the same manner as other serviceable items and returned to the U.S. Army supply system. Experience over the months has shown that for some assemblies, as many as 50 percent are serviceable. The return of these assemblies to the supply system can be accelerated at minimum cost and without expenditure of repair parts. The stripped remains of the vehicle and associated unserviceable, unrepairable parts are channeled through property disposal activities for sale as scrap.

Two methods are used to distribute the reclaimed assets to 8th U.S. Army units. One way is for major commands to station "expediters" at the CC&R facilities. The parent units telephone their critical repair part requests to these expediters. These requests are confirmed by requisitions against which issues are made from serviceable assets. The demand data are preserved and all issues are fully documented. The second way—and the normal one—calls for shipping the serviceable assets to the repair parts companies from either the CC&R facility or the general support company as appropriate. These assets are then applied against requisitions received from the using units in the conventional manner.

The degree to which the CC&R activity has increased the materiel readiness posture of 8th Army during the past fiscal year cannot be determined. There has, however, been a marked reduction in the deadline rates of materiel throughout EUSA. The following figures reflect the deadline rates of selected 8th FASCOM materiel during fiscal year 1968 versus fiscal year 1969:

	Average fiscal year 1968 (percent)	Average fiscal year 1969 (percent)	End fiscal year 1969 (percent)
Truck, ¼-ton, M151	18	5	1
Truck, 2½-ton, M35	18	7	2
Truck, 5-ton, M52	23	12	8
Materials handling equipment	42	25	12
Construction equipment	28	20	10

The actual monetary savings to the government for fiscal year 1969 are categorized as follows:

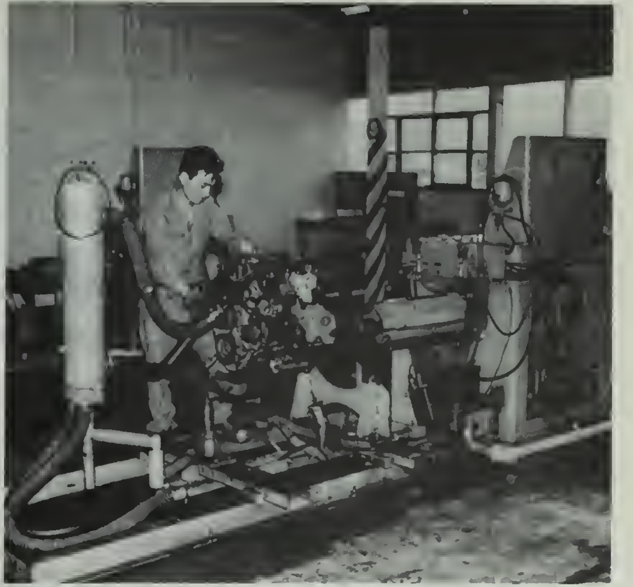
Major Assemblies	$1, 776, 054
Components	148, 194
Tires	255, 306
Batteries	24, 429
Total	2, 203, 983
Savings on items issued directly to using units	2, 525, 355
Total	4, 729, 338

The future looks promising for increased cost reductions by the 8th FASCOM centralized CC&R operations. The operations, although not sophisticated, are improving. Stripping of vehicles is being accelerated through the use of power tools and conveyors. Serviceability testing is being accelerated through locally designed and fabricated test equipment in the 8th FASCOM general support maintenance company.

The reclamation activities of the units of the 8th FASCOM have created an alternate source of supply for vehicle repair parts and have become an integral part of the 8th Army's logistical support system. Most important, the 8th FASCOM reclamation activities have contributed significantly to increased materiel readiness of the 8th U.S. Army.

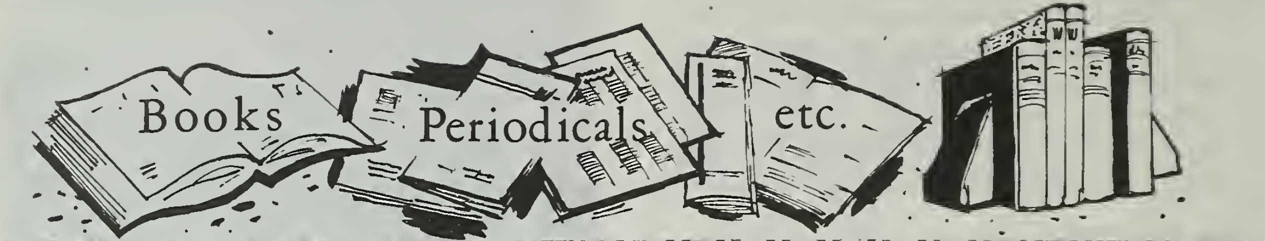
Sincerely,

George P. Holm,
Brig. Gen., U.S.A.



A reclaimed M151 Jeep engine from the 8th FASCOM collection, classification, and recovery facility is checked for serviceability with a Dynamometer in an 8th FASCOM maintenance facility.

Vehicles are disassembled in an 8th FASCOM collection, classification, and recovery facility by skilled technicians using power tools.



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Logistics management embraces many functional areas and disciplines. Within each of the functional areas and disciplines a great number of terms exist which are peculiar to specific tasks and responsibilities. The sum total of all these terms is "The Language of Logistics." It is through the use of these terms that the logistics manager must "successfully" communicate. This is a vast vocabulary which deserves not only recognition but effective use by logistics managers at all levels. Recognition and effective use can be accomplished through the creation of an approved DoD glossary of logistics terms available to all managers in the field of logistics. In can be an invaluable tool to the practicing logistician, the student, and the industrial complex dealing with the DoD and military services.

- Harper, Edwin L., Fred A. Kramer, and Andrew M. Rouse. Implementation and Use of PPB in Sixteen Federal Agencies. (In *Public Administration Review*, Nov.–Dec. 1969, v. 28, p. 623–632.)

Reporting on a survey of PPBS use in 16 Federal agencies, the authors conclude that, as a result of the system's "lack of attention to political bargaining," it has had little "influence on the major resource allocation decisions in domestic agencies."

- Horton, Forest W. Organization and Management Techniques in the Federal Government. (In *S.A.M. Advanced Management Journal*, Jan. 1970, v. 35, p. 66–77.)

Discusses the value of "task forces and project managers as techniques in improving problem solving and goal achievement as well as in motivating people to higher productivity and job satisfaction."

- Ink, Dwight and Alan L. Dean. From the Professional Stream: Currents and Soundings—A Concept of Decentralization. (In *Public Administration Review*, Jan.–Feb. 1970, v. 30, p. 60–63.)

This statement, prepared by members of an interagency steering group, discusses general principles for decentralizing the administration of Federal programs, major issues in decentralization, and the limitations of decentralization.

- Liu, Ben-chieh. Regional Income Inequality and Federal Government Expenditures, 1948–1963. (In *Quarterly Review of Economics and Business*, winter 1969, v. 9, p. 67–76.)

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- McGarvey, Patrick J. Grim Truth: The Federal Government Doesn't Know Where It's Going in R. & D. (In *Government Executive*, Nov. 1969, v. 1, p. 49–55.)

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- Mincer, Jacob, ed. Economic Forecasts and Expectations; Analyses of Forecasting Behavior and Performance. New York, Distributed by Columbia University Press, 1969. 251 p. (*National Bureau of Economic Research.* Studies in business cycles, No. 19.)

Contents: "The Evaluation of Economic Forecasts," by Jacob Mincer and Victor Zarnowitz. "Data Errors and Forecasting Accuracy," by Rosanne Cole. "Models of Adaptive Forecasting," by Jacob Mincer. "Expectations in the Term Structure of Interest Rates," by Stanley Diller. "Consumer Anticipations and Models of Durable Goods Demands," by F. Thomas Juster.

- Murphy, Thomas P. Congress, PPBS, and Reality. (In *Polity*, summer 1969, v. 1, p. 460–478.)

Concludes that Congress is unlikely to try to change its procedures to take full advantage of opportunities offered by PPB since most members of Congress are bound to feel that the new system threatens their control over the budget process.

- Murphy, Thomas P. Political Economy and Geographic Distribution of Federal Funds for Research and

Development: The Midwest case. (In *Administrative Science Quarterly*, Sept. 1969, v. 14, p. 426–442.)

Discusses the impact Federal expenditures have on different States and regions, and, specifically, why the Midwest has not received a fair share of Federal research and development expenditures.

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Contents: "Application of Program Budgeting to Transportation," by Kenneth E. Cook. "Notes on Program Budgeting Concepts and Methodologies," by Martin C. McGuire. "Program Budgeting and PPBS in the Federal Government," by Carl S. Rappaport. "Applying Program Budgeting to Highways: An Illustrative Example," by Lester P. Lamm, Jr. "State Level Program Budgeting Considerations," by M. E. Hermanson.

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Replies to an article by George E. Berkley in the "New Republic," Dec. 20, 1969.

• Quade, E. S. The Systems Approach and Public Policy. [Santa Monica, Calif.] 1969. 29 p. (Rand Corp. [Papers] P4053.)

"We have not and never may be able to make the systems approach a pure, rational, coldly objective, scientific aid to decisionmaking—only one far more so than its alternatives. But the systems approach is not a static concept—new procedures and techniques are being constantly proposed—and thus there is hope."

• Robinson, Kenneth L. The Draft Presidential Memorandum: Tool of Defense Decisionmaking. (In *Perspectives In Defense Management*, Dec. 1969, p. 41–51.)

Discusses the development and use of these analyses of defense problems and issues.

• Rosenberg, Nathan. The Direction of Technological Change: Inducement Mechanisms and Focusing Devices. (In *Economic Development and Cultural Change*, Oct. 1969, pt. 1, v. 18, p. 1–23.)

Explores the experience of the past 150 years to turn up clues to the nature of the mechanisms which initiate and direct exploratory activities" in the area of technological innovation.

• Rush, Harold M. F. Behavioral Science; Concepts and Management Application. [New York, 1969] 178 p. (National Industrial Conference Board. Studies in personnel policy, No. 216.) HF5549.A2N27, No. 216.

A brief exposition of the nature of the behavioral sciences, the current state of the art, its relevance to modern business organization, and case studies of applications in ten firms of varying sizes and industries.

To improve public understanding and put the military budget in a priorities framework, the following recommendations should be adopted. (1) The Secretary of State should present an annual posture statement to Congress, outlining U.S. foreign commitments and relating them to U.S. vital interests and the U.S. military posture. (2) The Defense posture statement should project costs of current and proposed military force levels and weapons 5 years ahead, and should include more cost data on specific components of forces and weapons. (3) A body should be set up within Congress to review the DoD and State posture statements in the context of broad national priorities, and to issue an annual report on them. Its membership should include Senators and Congressmen mainly concerned with military and foreign affairs, and it should have an expert staff.

• Schultze, Charles L., reexamining the Military Budget, *The Public Interest*, winter 1970, pp. 3–24.

To improve public understanding and put the military budget in a priorities framework, the following recommendations should be adopted. (1) The Secretary of State should present an annual posture statement to Congress, outlining U.S. foreign commitments and relating them to U.S. vital interests and the U.S. military posture. (2) The Defense posture statement should project costs of current and proposed military force levels and weapons 5 years ahead, and should include more cost data on specific components of forces and weapons. (3) A body should be set up within Congress to review the DoD and state posture statements in the context of broad national priorities, and to issue an annual report on them. Its membership should include Senators and Congressmen mainly concerned with military and foreign affairs, and it should have an expert staff.

• Seidman, Harold. Use of Experts and Consultants. (In *International Review of Administrative Sciences*, 1969, v. 35, No. 1, p. 61–67.)

Reports the results of a survey carried out by the Committee on Administrative Practices of the International Institute of Administrative Sciences.

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- Thayer, George. American Arms Abroad. (In *Washington Monthly*, Jan. 1970, v. 1, p. 62–73.)

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- Tozzi, Jim J. Establishing Priorities for Public Investments. Washington [Systems Analysis Group (Civil Functions), Office, Secretary of the Army] 1969. 21 p. HJ257.T25.

  Describes a methodology for determining for any proposed investment its contribution to the well-being of some groups, its detrimental effects on other groups, and an alternative use of the same resources.

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  Testimony by James R. Schlesinger, Acting Deputy Director, Bureau of the Budget, on the new trends and changing emphases regarding PPB that are under way in this Administration.

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  ". . . the issue is not so much how to make Government work, but how to make it work for public purposes. The problem to be solved is . . . the clear unambiguous statement of policy goals and effective control over their attainment. . . . First, the process of supervision and control must be made more systematic and comprehensive, and the current near monopoly of oversight by the presidential staff . . . must be broken. Second, the behavior of the permanent career employee needs to be professionalized."

About People Here and There—

MANAGEMENT—LABOR ACCORD

The photo demonstrates that management and labor find no bones to pick when it comes to recognizing inventive talent.

In the photo, Maj. Gen. Ormond R. Simpson, Commanding Officer of Marine Corps Supply Center, Albany, Ga., and George Burns, President of AFGE Local 2317 (left) hear Malcom Brooks, a guided missile mechanic, describe three tools he invented:

- One for installing bearings in actuators;
- One for replacing plates and pins in actuator cranks;
- One for repairing actuator valve covers.

These tools are saving the supply center nearly $1,000 a year. Brook's inventiveness earned him the title "Beneficial Suggestion Champ."

NAVY CENTER EMPLOYEE WINS $1,000 AWARD

Thomas M. Hayes, center, is shown receiving a $1,000 superior achievement award from Rear Adm. John A. Scott, left, Commanding Officer of the Navy Ships Parts Control Center, Mechanicsburg. Watching is Capt. T. J. Pawlowski, right, Director of the Center's Weapons System Coordination Division. Hayes developed a program to prevent overstocking of expensive components during the changeover of the fleet ballistic missile from the Polaris to the Poseidon system. The Hayes program has saved $1.5 million with an additional $500,000 expected during fiscal year 1970. He had received an initial award for $1,500 last June for superior achievement.

KNOWS KNOBS, NIXES NEED

Jack Kligman, a buyer at DSA's Defense Industrial Supply Center at Philadelphia, Pa., thought the price of $0.840 apiece for simple plastic knobs used on instrument control panels was out of line. So he referred the matter to Edward Barkasky, an equipment specialist, who ran a value engineering review on the item.

The review disclosed that commercial-type knobs were readily available and, although slightly smaller in diameter, would do the job just as well. The study further showed that by more clearly defining requirements, the knob could be obtained from several sources.

Procurement of the knob at a unit price of $0.228 instead of the original low bid of $0.840 meant an immediate savings of $5,814. Additional savings of over $10,000 are estimated for future procurements of the item.

NAVAL AIR SYSTEMS COMMAND RECEIVES COST REDUCTION AWARD

The Naval Air Systems Command Headquarters in Washington, D.C., was one of two headquarters commands throughout the Navy to receive the Secretary of the Navy Cost Reduction award for fiscal year 1969. (The other headquarters command selected was Commander-in-Chief U.S. Atlantic Fleet.) A field activity of the Naval Air Systems Command, the Naval Air Rework Facility at Jacksonville, Fla., was selected as one of 24 field activities to receive the award.

The award to the Naval Air Systems Command was based on achieving savings of over $183 million during the last fiscal year—a figure representing 44 percent of the Department of the Navy's total cost reduction program accomplishment.

Field activities of the Naval Air Systems Command achieved cumulative savings of over $80 million in fiscal year 1969, or 179 percent of the overall goal. The Naval Air Rework Facility at Jacksonville saved $6,286,700.

During the fiscal year some 111 validated cost-reduction actions were received at the Naval Air Systems Command Headquarters from the Jacksonville facility.

The presentation ceremony was held at Norfolk, Va., with the Secretary of the Navy, the Honorable John H. Chafee, making the presentations. Adm. I. J. Galantin, Chief of Naval Material, served as master of ceremonies. Admiral Galantin's command administers the cost reduction program.

The award for the Naval Air Systems Command was accepted by its Commander, Rear Adm. T. J. Walker. Capt. D. H. Heile, Commanding Officer of the Naval Air Rework Facility, Jacksonville, accepted the award for his command.

Commands receiving the awards received certificates and cost-reduction pennants which they may fly for a 1-year period. The pennants are blue with a circular gold field containing a blue anchor and the letters "C" and "R".

PROJECT LONG DOLLAR

Over-sized currency covers the subject at the Army Aeronautical Depot Maintenance Center in Corpus Christi, Tex., where "Project Long Dollar" racked up $1.3 million in identified cost reductions over a 90-day period. Col. Luther G. Jones, Jr., is the Depot's Commanding Officer.

Cheryl Moore
(in photo) is
"Miss Long Dollar."

DCA AWARDS

SAVED OVER $1 MILLION

Edward M. Cain, John H. Bardon, and Isadore Plotkin (at right) contributed suggestions that will save the Government more than $1 million over a 3-year period. Here Col. H. L. Grimm, USAF (L) Chief, Defense Communications Engineering Office (DCEO), Defense Communications Agency (DCA) presents the men certificates of commendation for their "Outstanding Contributions to the DCA Cost Reduction Program." Cain lives in Reston, Va., Bardon in Dunn Loring, Va., and Plotkin in Bethesda, Md.

RIPPON CITED

Stanley G. Rippon of Takoma Park, Md., accepts certificate of commendation for his outstanding contribution to the Defense Communications Agency (DCA) cost reduction program. Brig. Gen. F. H. Trogdon, USAF, deputy director, programs, presented the award.

MOTIVATOR

Joseph R. McPherson, (left) accepts certificate of commendation for his work as the cost reduction program coordinator for the Automatic Secure Voice Project Management Office, Defense Communications Agency (DCA). The citation said McPherson motivated others in his office to reduce costs, and that his efforts resulted in both value engineering and telecommunication management actions which produced savings of $306,000. Brig. Gen. F. H. Trogdon, USAF, deputy director, programs, presented the award. McPherson lives in Arlington, Va.

VALUE ENGINEERING

Ralph C. Goodrum (left) accepts certificate of commendation from Brig. Gen. F. H. Trogden, USAF, deputy director, programs, Defense Communications Agency (DCA), Arlington. Goodrum, who lives at Camp Springs, Md., and is DCA value engineering program coordinator, was instrumental in the achievement of a 3-year savings of $5.2 million during fiscal year 1969.

GENERAL WESTMORELAND HONORS 10 IN PENTAGON CEREMONY

In a recent ceremony in his office, Gen. William C. Westmoreland, Army Chief of Staff, honored two Army units and eight individuals for their outstanding contributions to the Army Cost Reduction Program.

The two units were the U.S. Army Infantry Center, Fort Benning, Ga., and the 1st Logistical Command, Vietnam.

"Because of the 1st Logistical Command's commitments in Vietnam," General Westmoreland said, "a representative was not able to come here today to accept the Command's award. However, I have asked the Commander in Chief, U.S. Army, Pacific, to present their award in my name." He also said that the Command's savings of over $20 million in fiscal year 1969 was an admirable accomplishment for an organization in an active theater, proving that economical management of resources, including the reduction of costs, is an appropriate concern of a combat-oriented command.

The U.S. Army Infantry Center, Fort Benning, Ga., was recognized for a cost-reduction achievement that greatly exceeded the standard ordinarily expected of an organization whose prime mission is to train men for combat. Savings of more than $4 million were realized in fiscal year 1969. Maj. Gen. Orwin C. Talbott, Commanding General of Fort Benning, accepted the award.

C. E. Baldwin was recognized for saving the Army $360,700 in fiscal year 1969 and fiscal year 1970. He is a component engineer at Longhorn Army Ammunition Plant, Marshall, Tex.—a GOCO plant operated by Thiokol Chemical Corp. He recommended substituting aluminum thimbles for brass thimbles in parachutes used with flare devices.

George F. Chambers, of the Louisville District, Corps of Engineers, saved $185,550 in fiscal year 1969 by substituting conveyor lines for covered ramps in the construction of a facility for loading explosives at Ravenna Army Ammunition Plant, Ravenna, Ohio. Loading of explosives normally requires cyclical heating between 142° and 70° F. Ammunition-carrying buggies pass from building to building alternately maintained at these two temperatures; passage is via covered ramps maintained at 70°. Ramps were planned for all four sides of the building, but Chambers determined that a rerouting of conveyor lines inside the building could replace ramps on three sides of the building.

Sfc. John A. Dorr, of the U.S. Army Air Defense Command, designed a simulator for training men to use target ranging radars (TRRs). The TRRs were unobtainable through supply channels, so the simulator enabled training in the Nike-Hercules system to be continued. Savings were computed at $39,000 for the elimination of maintenance costs, special test equipment, and spare parts that would have been required in support of the actual TRRs. Sfc. Dorr is stationed at McGregor Range, N. Mex.

S. Sgt. Lawrence E. Frawley designed and fabricated a new bracket which eliminated breakage of the air cleaner can, and complete replacement of the air cleaner on the 5-quarter-ton M715 and M725 trucks. This bracket has saved $22,800 at Fort Bragg, and Army-wide use of the idea is expected.

Jimmy G. McCaig, of Fort Polk, suggested that serviceable tires and batteries be removed from vehicles being sent to disposal. On-hand, unserviceable tires and batteries are put on the vehicles, while the usable ones are returned to stock for reassignment. Savings amounted to $26,100 in fiscal year 1969 and are estimated to be $71,300 for fiscal years 1969–1971.

Robert P. Nunnelley suggested that excess cargo trucks at Lexington-Blue Grass Army Depot be modified for use instead of purchasing three new Dempster-Dumpster trucks. Fiscal year 1969 savings amounted to more than $34,000.

Edward Sera enabled the U.S. Army Tank-Automotive Command to save more than $203,600 in fiscal year 1969. The Army was buying the turbocharger for the LDS–465 multifuel engine from the engine prime contractor. Mr. Sera thought a savings could be obtained by buying the turbocharger direct from the manufacturer (the subcontractor) and then providing it to the prime contractor. He therefore persuaded the subcontractor to submit a bid which resulted in a lower unit price.

Aldo P. Zanotta, of Watervliet Arsenal, proposed that rails from scrapped 175mm barrel assemblies be rehabilitated for use on new barrel assemblies, saving more than $856,000 in fiscal year 1969, and nearly $2 million in fiscal years 1969–1971. Mr. Zanotta is a value engineer and is responsible for numerous cost-reduction actions.

CUTS SUPPLY COSTS

Arthur M. Cody of Libertyville, Ill., accepts the Meritorious Civilian Service Award, the highest honor which can be bestowed by a Commanding Officer, from Capt. John H. Garrett, Jr., SC, USN. Capt. Garrett also gave Mr. Cody a superior achievement award of $650 for saving the Navy $10,445,000 by reducing the cost of provisioning electronic repair parts for a countermeasures system. A retired Navy Chief Electronics Technician, Cody now is employed as a general supply specialist in the Provisioning and Allowance Division of ESO.

DOD VALUE ENGINEERS MEET

Conducting a VE conference for 150 industrialists at San Francisco Defense Contract Administration Services Region were: Leigh Parker, multiregion value engineer for DCAS; Richard E. Meyers, head of the VE branch at San Francisco Bay Naval Shipyard; Rudy Kempter, Deputy Director of VE in Office of Assistant Secretary of Defense, I&L; David E. Garen, VE manager at Sacramento Air Materiel Area; Milton Walkup, chief of Engineering Evaluation Branch, U.S. Army San Francisco Procurement Agency.

COLOR REVERSAL PRINT FILM

Fort Lewis, Wash., uses approximately 1,860 35mm color slides per month in various training classes. A 20-exposure roll of film for a hand camera costs $1.50 per roll—or 7.5 cents per exposure. In addition, in normal use there is a loss in quality when duplicate slides are made.

Mike Zamos found that a duplicating film used in motion picture printing did a better job of fidelity reproduction at a fraction of the previous cost. The duplicating film has 800 exposures per roll. The roll costs $7.03—or 0.8 cent per exposure.

As a result, the monthly cost has been reduced from $139 to $16—for annual savings of $1,476.

BEEF-LIFT BRINGS HOME BACON

Unloading 150-pound sides of beef from truck to commissary was a four-man job until SH1 Oscar D. Hudson suggested adding 30 inches to the meat hauling rail.

Formerly, it took two men to move the beefs from inside the truck to the tail of the truck and two more men to lift it to the rail. Now the 30-inch-longer rail extends into the truck from the unloading platform so that the first two handlers can lift the beef directly to the rail.

The photo shows Capt. Kenneth Steen, Commanding Officer, Naval Support Facility, Yokohama, handing Hudson a $20 check for his labor-saver.

THE GREAT MANHUNT

If you do not tell a man where to go to begin with, you may have to chase him down later to give him the word. That common-sense tidbit saved the Army $117,264.

Soldiers serving overseas occasionally volunteer for—and receive—a second overseas assignment in another theater. These "inter-theater transfer personnel" usually want to take a 30-day leave at home in the United States between these foreign assignments. They arrive in droves at commercial airports. Kennedy Airport, for example, processes over 3,000 per month.

Returnee-reassignment stations at the airports, issued port calls instructions to the men. The problem was that the men frequently didn't know they were supposed to stop by the returnee-reassignment stations.

The R–R stations, however, knew the men were coming and usually were able to intercept them. Sometimes, though, a man will change his flight, or in some other way accidentally miss the R–R station. So there were always a few who, innocently enough, would leave the airport without their instructions.

The R–R station teams therefore had to find the men. The next problem was that sometimes their families had moved and the mailed instructions would be returned as undeliverable. When this happened, it became a time consuming job to locate these people.

Fort Hamilton, N.Y., proposed a new procedure that would make the overseas commands responsible for including instructions in the soldier's basic orders. The proposal was bought and 18 military personnel spaces were eliminated.

EASY SET-UP

One set-up man can stay ahead of two welders in putting together box trail assemblies for 105mm howitzers. That work-methods gem saved the Army $24,160 because the original work order for assembling 307 units had specified one set-up man per welder. The change cut assembly time in half.

Aldo P. Zanotta, Watervliet Arsenal, and Ralph H. Wildman, Rock Island Arsenal, made the work-methods study.

Zanotta is an "old hand" at cost reduction. He was recognized by Gen. William C. Westmoreland in a Pentagon ceremony earlier this year for his value engineering study of rails for the 175mm M113 gun tube assembly. Savings resulting from this study totaled $856,343 in fiscal year 1969, and $1,954,186 for fiscal years 1969–71.

FINDS MONEY IN LOCKERS

Casual shopper Sgt. Maj. Howard W. Romine found a real bargain in the Fort Irwin properties disposal area: 550 personnel wall lockers somewhat the worse for wear. A little work and some minor parts made these shipshape for the summer training program. Repair cost was $5.63 per locker. A new locker would have cost $24. Savings aggregated $9,680.

SALE RETURNS 71 PERCENT PROFIT

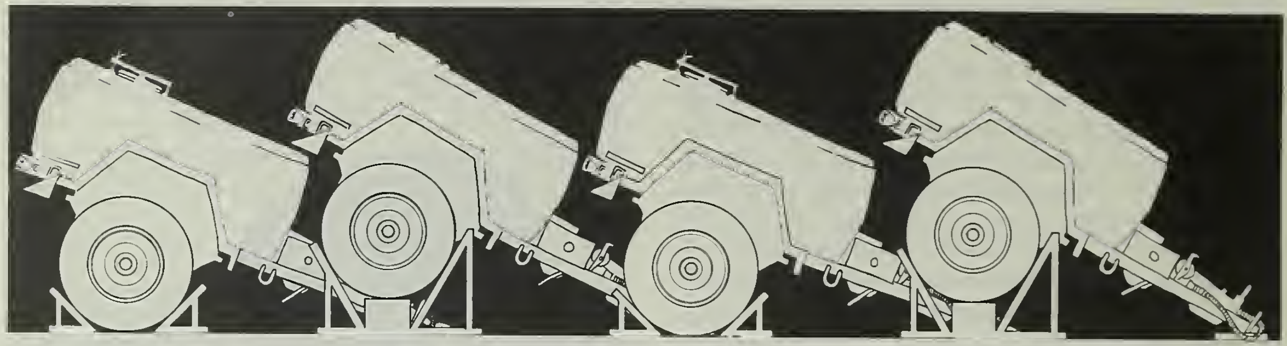
Even in these inflationary times, it is seldom possible to sell a 25-year-old machine for more than it cost.

The Defense Logistics Services Center, Battle Creek, Mich., did just that recently when his auctioneers sold a Department of Defense surplus vertical boring and turning machine purchased by the Government in 1944 for $24,900. Although used for 25 years, the machine was sold for $42,500—171 percent of its original cost.

DLSC, a field activity of the Defense Supply Agency, manages the sale of material declared surplus by the military services.

While the return on machine tools currently averages about 18 percent of the original cost, the resale value of machine tools varies widely in accordance with their complexity and versatility. For example, in 1964 a 22-year-old boring mill brought $56,000, 187 percent of cost.

Sales of usable surplus property carried out by DLSC's surplus sales offices throughout the country bring an average return of $32.5 million annually. In addition, worn out and obsolete equipment sold for scrap brings an average $29.5 million. After deducting operating costs, these funds are returned to the U.S. Treasury.



CONTAINERIZATION OF WATER TRAILER FOR MOVEMENT BY SEA-LAND VAN

SHARPE EMPLOYEES REAP $1,880 DIVIDEND

Two Sharpe Army Depot employees found a way to load a van with 344 cubic feet more cargo than the van was designed to hold. This trick saved the U.S. taxpayer $776,000 this fiscal year.

Roy Bullard and George Minamide of the Depot's Receiving and Transshipment Division, directorate for distribution and transportation, will share a total of $1,880 for devising a more efficient method of shipping water storage trailers from the depot to Southeast Asia.

The old way was to process the water trailers at Sharpe, load them on flat-bed trailers, and ship them to the Port of Oakland. At Oakland, the trailers were unloaded, then loaded on ocean vessels, with further unloading at the overseas destination.

The Sharpe employees' method involved containerized transportation through use of commercial SEA-LAND vans. Through measuring, sampling and experimenting, they were able to squeeze four water trailers into one SEA-LAND van. Since each trailer measures 608 cubic feet for a total of 2,432 cubic feet, and the vans are designed to hold 2,088 cubic feet, the two Sharpe workers' solution is virtual magic.

The solution is an overlapping-nesting arrangement, with the second and fourth trailer elevated 13 inches from the van's floor to create this effect. (See figure.)

The SEA-LAND vans are loaded directly onto special cargo ships that are designed to pack the loaded vans in a manner to utilize all available space. Once unloaded overseas, the vans are used for reloading other cargo for return to the United States.

The estimated first-year saving of $776,000 may be exceeded through shipment of additional trailers and lowering of preservation requirements as a result of containerization, Army authorities report.

George Minamide, left, general supply specialist at Sharpe Army Depot, discusses with Roy Bullard the critical height factor in the "containerized loading" of four Army water trailers aboard a SEA-LAND van for shipment to Vietnam. Co-suggester Bullard, supply management officer, shared an Army award which has resulted in validated cost-reduction savings for the Army Materiel Command of $776,000.

HERE'S A NEW ANGLE

Why buy an angle when you can make one? That's the way telecommunications personnel at the U.S. Joint Support Command, Fort Ritchie, Md., reasoned and it paid off to the tune of $3,000 a year in savings.

Condulets are angled connectors for conduit pipe. A 1½-inch condulet costs $9.62. The Command had been using 400 condulets a year.

How did the Command save the money? By not buying any more condulets.

How, then, did the Command form the angles it needed? By bending the conduit pipe—at a cost of $1.92 per bend.

THREAD MAKES NUT SELF-LOCKING

Ask any squirrel. Acquiring nuts is serious business. Or ask the Defense Industrial Supply Center (DISC), Philadelphia, a Defense Supply Agency field activity. It saved $20,823 on a single purchase of 36,000 self-locking extended washer nuts used in aircraft engines.

Joe Meccarielli, a DISC equipment specialist, discovered that the manufacturer offered a nonlocking 24¢ alternate to the prescribed self-locking 33¢ nut. So he instituted a value engineering analysis. The analysis showed that a different thread could be placed on the alternate nut to provide the required self-locking function, and that the alternate could then be substituted for the original nut.

Acceptance of the alternate nut was coordinated with the Naval Air Engineering Center.

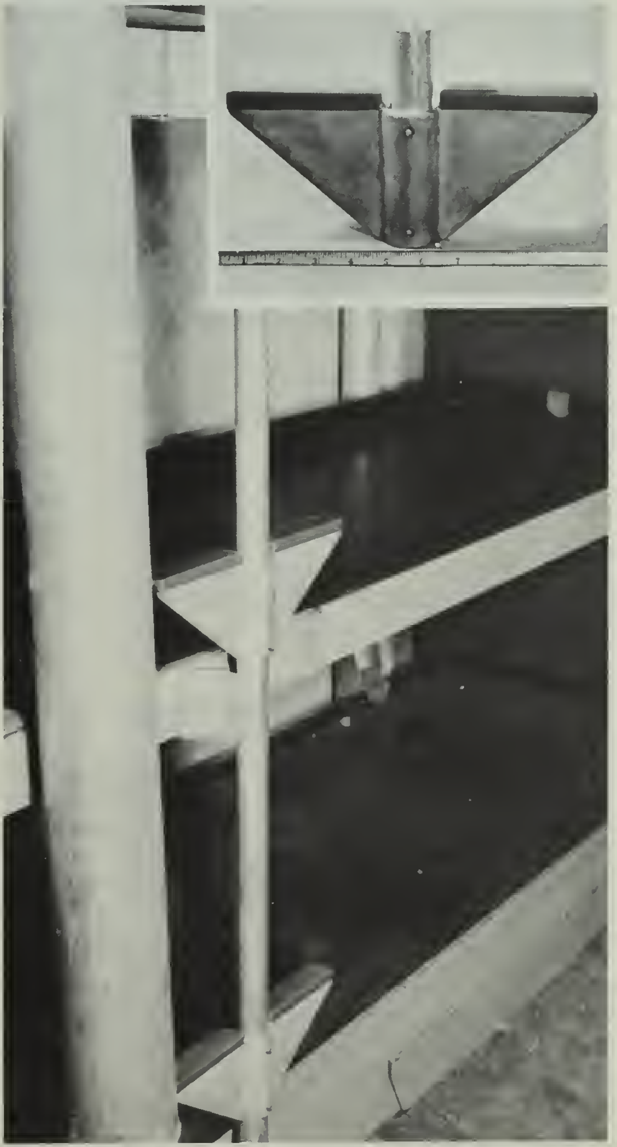
DISC was thus able to purchase 36,000 nuts at a savings of $20,823.

LOW COST STEPS ASSIST AT BERTH

The CVA–41 *Midway* is a big ship with many berths. Bottom and second-level berths have steps to help sailors climb into second and third level berths (see picture). Not long ago these steps cost 5½ times more than they do today because the specifications required production shops to fabricate the steps from flat sheet material. That process involved a dimensional layout on flat sheet material; cutting the irregular shaped parts; forming the desired shape; grinding or smoothing edges; and coating the upper portion with plastisol, a synthetic plastic material used to protect the step and provide a nonskid surface. Labor and material cost of the fabricated step was $18.36 each.

A value engineering study, conducted at the request of a planner and estimator at Hunters Point Naval Shipyard, San Francisco, California, caused management to initiate a design change that replaced the fabricated step with a low cost commercial die-cast plastisol-topped aluminum step.

Contract cost of the first 2,000 cast aluminum berth steps was $5.65 each. A second contract for a quantity of 1,400 reduced the cost to $3.25 each. The fiscal year 1969 savings amounted to $45,844.



PACKING, RESHAPING AND PRESERVATION

PRESCRIBES NEW MEDICAL LOAD

Directives said that triwall fiberboard vendor containers of medical injection supplies in nonrefrigerated shipments to Southeast Asia had to be packed in wirebound plywood boxes. That was before Defense Depot, Tracy (Calif.), got permission to forget the plywood. Now the fiberboard containers are sheathed, capped, and banded to 40- x 48-inch pallets and loaded into vans. This switch saved Tracy $60,000 in fiscal year 1969, with more to come in years ahead.

Photo shows Earl Micenheimer forklifting the less-costly package.

CHEAPER BY THE PAIR

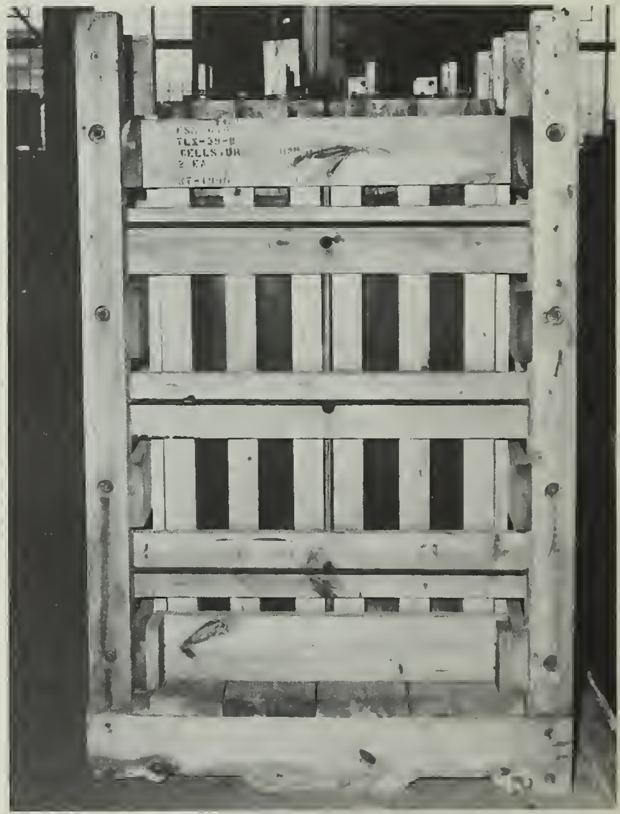
San Francisco Bay Naval Shipyard reports that it is $67,000 a year more economical to handle battery crates that hold two cells than those that hold one.

Figure it this way. The shipyard dismantles, repairs, assembles, etc., many, many submarine batteries every year, and each battery has 126 cells, and each cell is approximately 24 inches square and 60 inches high. In order to repair and dismantle the batteries, the individual cells are frequently removed from the battery and installed in wood handling crates for protection during shipment and storage.

The battery cell crates used are designed to contain a single cell and are a snug fit for the cell to provide maximum protection. Since submarine batteries are assembled and shipped to various stations all over the world from this facility, considerable time is required for handling, loading, and unloading crates.

Fred McWilliams of the electrical department at San Francisco Bay Naval Shipyard suggested that battery crates capable of holding two cells would eliminate considerable crate-handling time. Samples of crates were built and tested. Analysis showed that the double cell crates reduced handling cost, the amount of floor space required during charging and storage operation, and the initial cost of crate manufacture.

The double cell crates saved $44,902 for the 8 months they were used in fiscal year 1969. Nine batteries were processed during this time. Add to this the considerable amount of money that will also be saved in scarce and costly cargo space when batteries are transported by rail or ship.



The new battery crate which contains two single battery cells, reduces the amount of floor space required for storage, reduces construction cost of crates and saves considerable labor cost in handling of crates during charging and processing.

USMC SHIPS BULK ELECTROLYTE

Headquarters Marine Corps has quickly stepped in to praise and award a civilian-Marine beneficial suggestion "team" from the Marine Corps Supply Center, Albany, Georgia.

The team members, Col. R. G. Eykyn and Joe T. Abernathy, collaborated on a suggestion that electrolyte for energizing batteries and all tracked and wheeled vehicles be included on the stock list as a unit responsibility item.

As a result of the suggestion, shipment of electrolyte in bulk quantities will be made to motor transport units in the field at a savings in packaging and packing costs as well as transportation costs, At the present time, each vehicle shipped requires packaging and packing with vermiculite and wooden containers which will not be required when bulk shipped to the motor transport service unit.

After studying the merits of the suggestion, HQMC published Marine Corps Order 4032.3B which implements the suggestion at all Marine Corps activities.

As a "fringe" benefit, Col. Eykyn and Mr. Abernathy were each awarded $200 by Headquarters Marine Corps on the basis of $7,000 tangible savings for the first year.

No local award has been made yet, but a cost reduction is being submitted as a result of the suggestion.

Col. Eykyn is the director of materiel division, and Mr. Abernathy is a supervisory preservation packaging specialist of MOWASP operations branch.

PALLET-ABLE FABRICATION

Tokutaro Ano, foreground, and Eiyoshi Funazaki are applying the finishing touches to a pallet fabrication operation initiated by Francis Kunimura, Chief of the Maintenance Division, U.S. Army Printing and Publications Center, Japan. Approximately 3,800 pallets have been made from lumber salvaged from crates containing paper stock consigned to the printing plant. The pallets are used for shipping leaflets and printed materials to Southeast Asia. Savings amounted to over $8,000.

A GROUP IS NOT A LOT

The ballistic test requirement said fire 63 rounds from each lot. That—figured H. Sherman Finley, a supervisory ammunition inspector at Umatilla Army Depot—is OK for testing large lots of new items but didn't make much sense for small lots of renovated mortar ammunition. Turns out he was right.

Finley assembled 17 small lots into 4 groups—and proposed testing only 63 rounds from each group. His idea was accepted. Instead of 1,071 rounds (63 × 17 lots) going to Yuma Test Station, only 252 rounds (63 × 4 groups) were stripped and fired.

Finley's suggestion saved Army $40,905 in ammunition, testing, and transportation costs in fiscal year 1969.

SWITCHES

SWITCH EXTENDS EQUIPMENT LIFE

An electronics technician with the 4780th Avionics Squadron at Perrin Air Force Base, Tex., has come up with a cost-reduction idea that is expected to save the Government almost $300,000 in the next 3 years.

Martin Cappi, Jr., attached to the Airborne Weapons Control Systems branch of avionics, suggested installing a simple "on-off" switch on a reciprocating compressor on the F–102 aircraft. The switch would permit in-flight shutdown of the infrared compressor without disabling the MG–10 radar system.

This modification makes it possible to eliminate unnecessary compressor and absorber operating time, thus increasing compressor and absorber life by the same proportion.

Expected savings for the nine months of fiscal year 1970 (October–June) will come to almost $80,000. Adjusted to reflect the entire 12-month cycle figures, it is estimated over $106,000 will be saved in each of the next 2 fiscal years (1971–72).

Before Cappi's idea was acted upon, replacement costs for 32 compressors and 116 absorbers came to $211,828.40. Labor added an additional $1,474.08, for a total cost of $213,302.48 to keep the system operative.

Now, since the installation of the "on-off" switch, the cost of materials needed has been slashed by roughly 50 percent ($105,914.20). Likewise, labor costs have dropped in half, down to $737. The new total expenditures come to $106,651.24, exactly one-half of the former total.

FLIPPED SWITCH SPARES SPARES

The simple procedure of flipping a switch from "on" to "off" saved Army $42,700 for spare parts.

The engine de-icer switch on the OVI Mohawk aircraft relays electrical heat to the propellers during flight. Formerly, this switch was not listed on the landing checklist. It was therefore left on after landing, causing over-heating and damage.

Paul Koch, of Fort Lewis' Aircraft and Guided Missile Branch, suggested that the U.S. Army Aviation Materiel Command amend technical manuals to include landing check instructions to turn the switch to "off." He also suggested that the manuals include a caution that the de-icer switch *not* be turned "on" while the plane is on the ground because high de-icer temperatures can cause propeller damage in dormant air.

A RAIL SWITCHEROO

By coupling their talents, two Army employees in Alaska applied brakes to the highballing costs of railcar switching. That sounds cryptic unless you know that the Army was paying the Alaska railroad to supply crews and locomotives for switching railcars from intercharge points to locations inside Fort Richardson and Fort Wainwright—at a cost of $60 per hour per crew.

Then along came Harley S. Osburn, a transportation officer at Fort Richardson, and George D. Mohr, a traffic manager at Headquarters, U.S. Army, Alaska, to suggest:

- Paying by the switch instead of by the hour, and
- Positioning railcars during in-line hauls to minimize the need for standby switch crews and locomotives

The new tariffs published by the Alaska railroad now call for a basic charge of 4 cents per 100 cwt. or a minimum of $20 per car switched. Fiscal year 1969 savings totaled $125,944. In addition, CONUS shippers are being advised to avoid mixed loads where possible so that cars can be unloaded at a single place.

Army yardmasters and members of an Alaska railroad switching crew discuss the new switching procedures at Fort Richardson.

DRUM SEWS TENTS QUICKER

Camp Drum, Watertown, N.Y. (1st U.S. Army) now repairs tents in half the time.

Time was when four men unrolled, inspected, marked tears and holes, and moved and lifted each reparable tent on and off a stationary industrial sewing machine while a fifth man operated the machine. This fix-up process consumed 20 man-hours per tent.

Then came the dawn. Two block-and-tackle devices installed on steel rafters 16 feet apart, now enable one man to raise the canvas, inspect and mark the holes. Castors make the sewing machine easily maneuverable. The machine operator, with help from the repairman, guides the canvas through the machine. The tents now are repaired in 10 hours, saving $30.70 per tent over the old method. Camp Drum repairs approximately 200 tents a year.

CONTAMINATED FUEL OK FOR PRACTICE REFUELING

Eliminating fuel filter changes on 19 fuel servicing vehicles at Chanute AFB, Ill., saved the Air Force $2,361.28 in parts and labor.

A suggestion submitted by Lewis J. Kingston, Vehicle Maintenance Branch, said that since the vehicles were utilized with contaminated fuel *for training purposes only*, the practice of changing separator and coalescer elements could be eliminated.

As a result, Headquarters Air Training Command granted a waiver to discontinue scheduled element changes for refueling vehicles which are used for training.

DUNNAGE LUMBER

Many ships discharging cargo at the Yokohama Army Port facility accumulate lumber used as dunnage in the shoring of freight.

The Yokohama area post engineer requires lumber of various grades to make repairs and to build concrete forms, retaining walls, and crating. A review of work-order lumber requirements found that the excess dunnage lumber was suitable for these jobs. As a result, the dunnage was obtained on a nonreimbursable basis with fiscal year 1969 savings amounting to $2,500.

MUNITIONS MAINTENANCE ACTION SAVES $1,449,500

Munitions maintenance personnel of PACAF's 18th Tactical Fighter Wing have implemented a simple change in the procedure for loading the M–61 gun system on the F–105–D/F, that will conserve over $1 million worth of 20mm ammunition during fiscal year 1970 through fiscal year 1972.

Each day the wing is required to rotate one of its 105s on alert status at a forward operating location. Formerly, each time an aircraft was placed on alert, target practice rounds in the M–61 gun system had to be replaced with high explosive incendiary (HEI) ammunition. When the alert tour was completed, the procedure was reversed and the M–61 was reloaded with target practice ammunition. Since the M–61 gun system could not reuse HEI ammunition that had been previously cycled through the gun system, new ammunition was required for each alert loading. The HEI ammunition removed from the M–61 after alert, was relinked and used in the M–39 gun system. About 65 percent of these rounds could not be relinked and were discarded.

Munitions maintenance personnel determined that it was possible to preload the HEI ammunition drums and to transfer them from one alert aircraft to another. Today, the rounds in these drums are linked to the target practice rounds remaining in the gunfeeder system, thus eliminating the need for a completely new load of HEI each time the aircraft is loaded for alert duty and precluding the loss of 244,130 rounds of HEI ammunition each year.

CASH FOR THINKING

Chief Warrant Officer (retired) Sedrick G. Laughlin (left) receives a suggestion award certificate and a check for $1,150 for a suggestion that eliminated the requirement for painting fuel acceptance rates on military vehicles. Making the presentation is Col. Robert M. Rufsvold, Commanding Officer of the 138th Engineer Group, Fort Riley. The suggestion resulted in an estimated annual savings of $100,000 in manhours and materials. CWO Laughlin resides in Weeping Water, Nebr.

ALL TORN UP

Marion Dekle, an accounting technician at the Marine Corps Supply Center in Albany, Ga., ripped up the Center's transaction register of obligations and commitments when he found that most of the data recorded on the transaction register were duplicated on other reports. Deletion of the register immediately eliminated the need for many hours of labor, expensive material and rental equipment saving the Center $11,952 annually. Dekle received $600 for his discovery.

Get action. Do things; be sane, don't fritter away your time; create, act, take a place wherever you are and be somebody; get action.

—Theodore Roosevelt

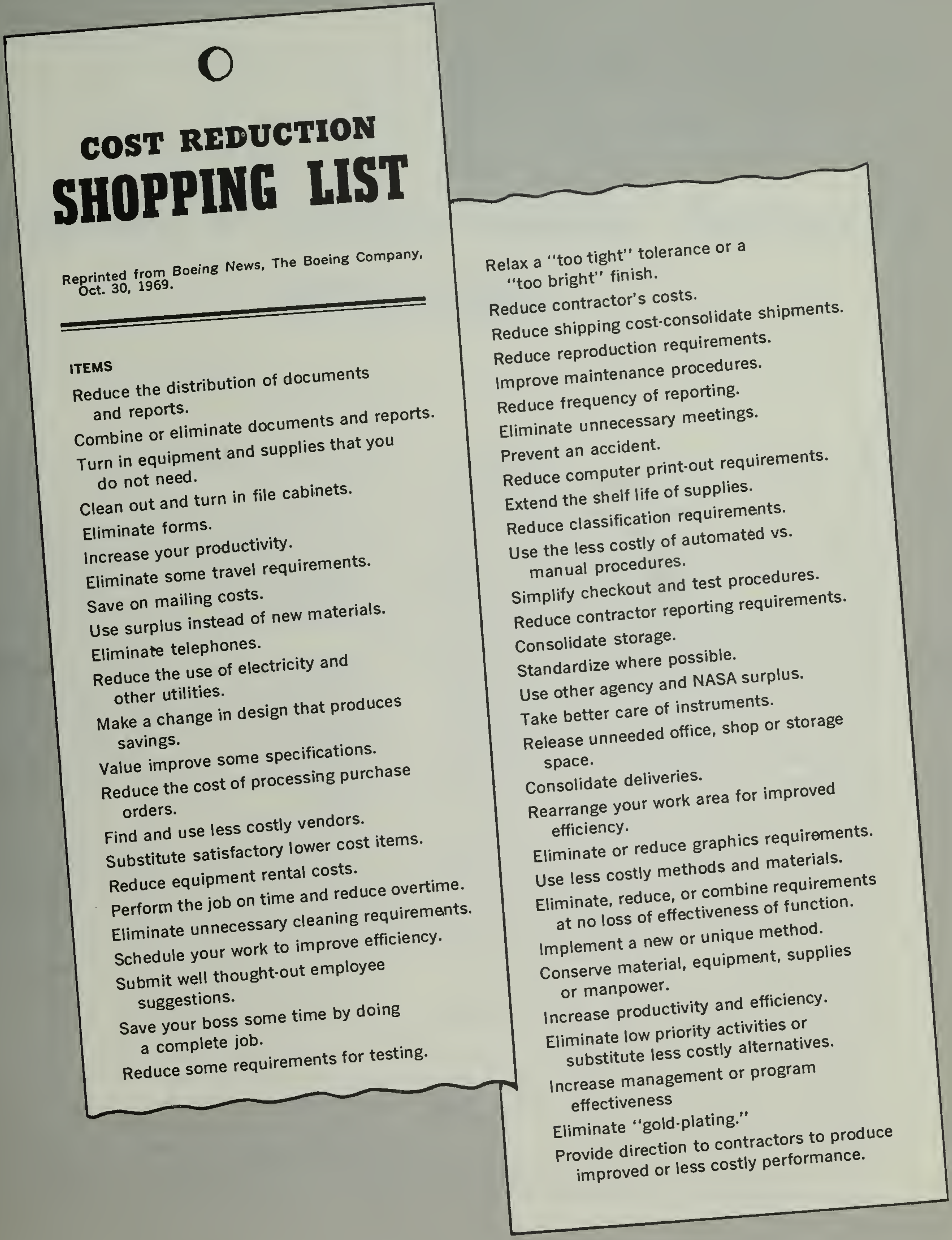
NAVPRO HUSTLES AT BOEING

Not too long ago CH–47 helicopter rotor blades were completely disassembled for repair when the nose cap assembly was suspected of having a low wall thickness. Now, by drilling a 0.250-inch-diameter hole in the leading edge of the roto blades it is possible to measure accurately the actual thickness of the nose cap assembly. If that thickness is within certain limits, it is only necessary to make a minor standard repair to the rotor blade.

Over a 6-month period, 40 percent of the rotor blades processed under the new inspection procedure have been saved from the expense of complete disassembly. Savings amounted to $243,000 in fiscal year 1969, and will run an estimated $326,000 annually thereafter.

Aerospace engineer A. J. Paranich and aircraft quality control assistant C. W. Hess, both employees of the Naval Plant Representative Office at the Boeing Co., Vertol Division, Philadelphia, Pa., received a check for $1,380, letters of commendation, and certificates of merit for their idea.

Lt. Comdr. R. C. Schwartz, Acting Naval Plant Representative at the Boeing Co., Vertol Division, Philadelphia, Pa., presented letters of commendation and certificates of merit to the group pictured in recognition of their active support of the Navy's Cost Reduction Program. The cost reduction suggestions submitted by the group played a large part in helping NAVPRO Philadelphia to meet and exceed its fiscal year 1969 cost reduction goal. Seated are (left to right): R. B. McLaughlin, J. A. Monteleone, W. E. Scott, and A. V. Brisgone. Standing are (left to right): J. R. Balch, J. J. Doyle, J. T. Bowe, J. H. Welsh, J. J. King, D. N. Scartelli, A. M. Spiegel, N. H. Ward, R. T. Carey, and Lt. Comdr. R. C. Schwartz. Not shown is M. J. Proch.



COST REDUCTION

SHOPPING LIST

Reprinted from *Boeing News*, The Boeing Company, Oct. 30, 1969.

ITEMS

- Reduce the distribution of documents and reports.
- Combine or eliminate documents and reports.
- Turn in equipment and supplies that you do not need.
- Clean out and turn in file cabinets.
- Eliminate forms.
- Increase your productivity.
- Eliminate some travel requirements.
- Save on mailing costs.
- Use surplus instead of new materials.
- Eliminate telephones.
- Reduce the use of electricity and other utilities.
- Make a change in design that produces savings.
- Value improve some specifications.
- Reduce the cost of processing purchase orders.
- Find and use less costly vendors.
- Substitute satisfactory lower cost items.
- Reduce equipment rental costs.
- Perform the job on time and reduce overtime.
- Eliminate unnecessary cleaning requirements.
- Schedule your work to improve efficiency.
- Submit well thought-out employee suggestions.
- Save your boss some time by doing a complete job.
- Reduce some requirements for testing.
- Relax a "too tight" tolerance or a "too bright" finish.
- Reduce contractor's costs.
- Reduce shipping cost-consolidate shipments.
- Reduce reproduction requirements.
- Improve maintenance procedures.
- Reduce frequency of reporting.
- Eliminate unnecessary meetings.
- Prevent an accident.
- Reduce computer print-out requirements.
- Extend the shelf life of supplies.
- Reduce classification requirements.
- Use the less costly of automated vs. manual procedures.
- Simplify checkout and test procedures.
- Reduce contractor reporting requirements.
- Consolidate storage.
- Standardize where possible.
- Use other agency and NASA surplus.
- Take better care of instruments.
- Release unneeded office, shop or storage space.
- Consolidate deliveries.
- Rearrange your work area for improved efficiency.
- Eliminate or reduce graphics requirements.
- Use less costly methods and materials.
- Eliminate, reduce, or combine requirements at no loss of effectiveness of function.
- Implement a new or unique method.
- Conserve material, equipment, supplies or manpower.
- Increase productivity and efficiency.
- Eliminate low priority activities or substitute less costly alternatives.
- Increase management or program effectiveness
- Eliminate "gold-plating."
- Provide direction to contractors to produce improved or less costly performance.

President's Advisory Council on Management Improvement

The President on February 11, 1970, signed an Executive Order establishing the President's Advisory Council on Management Improvement. The Council consists of 10 members—executives from the private sector with broad backgrounds in management. It will meet at regular intervals and recommend to the President (and the Director of the Bureau of the Budget) improved methods and procedures that can be introduced to sharpen the efficiency of Government operations. The Council will seek to promote better management practices as a means toward two goals—dollar savings and improved services to the public.

The President appointed Bernard A. Schriever, of Washington, D.C., as Chairman. Schriever is Chairman of the Board of the Arlington, Va., consulting firm of Schriever & McKee Associates, Inc.

The Advisory Council on Management Improvement replaces the President's Advisory Council on Cost Reduction, created in 1967 as a temporary body which would disband after its final report. The new body, by contrast, has broader responsibilities and a permanent charter. It will receive staff support from the Bureau of the Budget's Office of Executive Management.

A representative of the President's Advisory Council on Executive Organization will work with the new Council as an observer and consultant to insure coordination of the two efforts. (The Advisory Council on Executive Organization is concerned with structural improvements; the newer council, with precedural changes).

The establishment of the Advisory Council on Management Improvement is one step in the four-part management improvement program. Other steps will be:

Cost Reduction. The present cost reduction program will be changed sigificantly to include the effects of cost reduction in the budget formulation process.

Management Effectiveness Program. This program is designed to identify and indicate the effects of a total management effort applied to persistent problem areas.

Study of Government-Wide Cost Areas. Periodically, the Bureau of the Budget will choose a common cost area for Government-wide attention. Agency management will focus on the selected area for potential management improvements. The first area of study under this program will be paperwork and excess reporting.

On February 16 Robert Mayo, Director of the Bureau of the Budget, issued a revised Circular No. A–44 to establish a formal Government-wide management improvement program. According to the circular, the program will consist of five elements: (a) Management effectiveness; (b) cost reduction; (c) idea interchange; (d) Presidential recognition of exceptional improvement actions; and (e) periodic study of Government-wide operations. An attachment to the circular prescribes guidelines for preparing a management improvement report. These guidelines call for measurements of management effectiveness as well as quantification of cost reductions. According to a Defense Department spokesman, this new Government-wide program follows closely the outlines of the year-old Defense Logistics Performance Measurement and Evaluation System and the long established Defense Cost Reduction Program. □

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A CREDO

FOR THE NATION'S DEFENDERS

I Believe that we must balance our need for survival as a nation with our need for survival as a people. Americans, soldiers and civilians, must remember that defense is not an end in itself [illegible]

I Believe [illegible]

I Believe [illegible]

I Believe [illegible]

I Believe [illegible]

I Believe [illegible] risks, not foolish risks. We shall not [illegible]

I Believe [illegible]

And I Believe This Above All: This nation shall [illegible] in creating a just world order [illegible]

FROM THE PRESIDENT'S SPEECH AT THE
AIR FORCE ACADEMY JUNE 4, 1969

Richard Nixon

UNIVERSITY OF FLORIDA
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FLARE